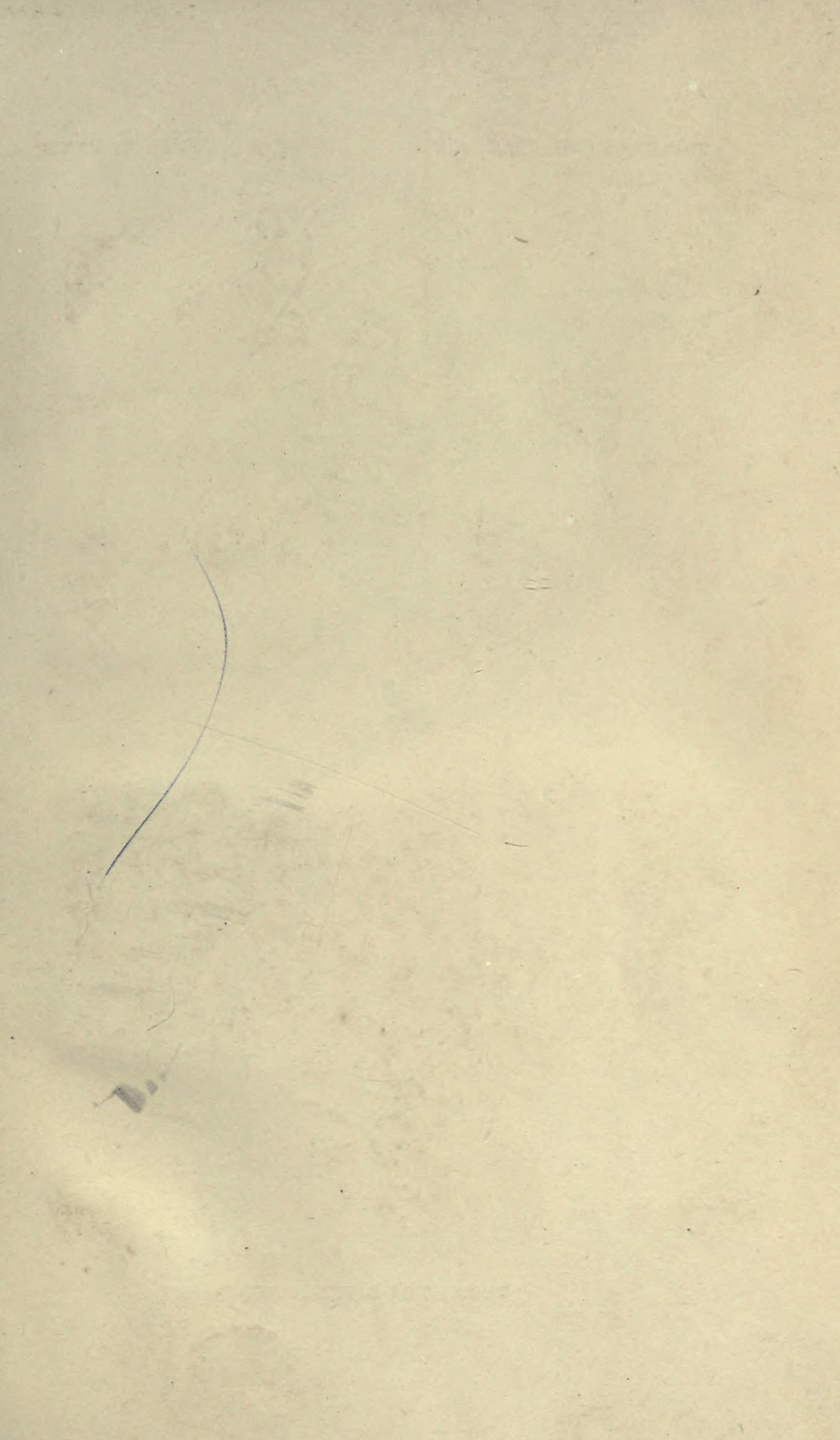


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The
Genus *Phoradendron*



A Monographic Revision

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CONTENTS

Distribution map	Page Frontispiece
Introduction	
Prefatory	3
Nomenclature	4
Historical summary	5
Analysis of characters	7
Parasitism, hosts and enemies	13
Origin of the genus	14
Range of species	15
Taxonomic summary	16
Illustrations	17
Monograph of <i>Phoradendron</i>	
Generic description	19
Primary division of the genus	19
Analysis of the Boreales	
Pauciflorae	20
Pluriseriales	29
Calyculatae	54
Analysis of the Aequatoriales	
Interruptae	
Foliosae	55
Basinerviae	55
Peninerviae	128
Saquamosae	140
Parodoxae	142
Continuae	143
Percurrentes	143
Dichotomae	156
Explanation of plates	163
Indexes	
Collections	187
Occurrence	
North America	211
South America	214
West Indies	216
Pacific Islands	217
Species excluded	217
Names and synonyms	218
Plates 1—245.	

INTRODUCTION

PREFATORY

My attention was seriously called to the need of a revision of our leafy mistletoes through inability to understand the basis of characterization that could admit to one species such different appearing plants as those from the southeastern, southwestern and arid United States—not to mention California and Yucatan—to which the name *Phoradendron flavescens* is currently applied. Among their manifold differences, a diligent search was made for characters; the types of related species and varieties that have been held to be differentiable from *flavescens* were examined; and every form occurring in the United States was traced to the known limits of its range, sometimes south of our national border. In the course of this study it became apparent that the great conservatism of Engelmann, who seems never to have given this genus the care that marked his study of the related genus *Arceuthobium* or *Razoumofskyia*, had not only caused him to withdraw segregates of *P. flavescens* that he admitted at one time, but had reacted on his early colleague in the study of our southwestern plants, Torrey, to the extent of causing a number of mistletoes which had been designated in the Torrey herbarium as new species to lie there, as they still do, without publication. As political boundaries do not often form satisfactory limits to such a study as I had begun, I was quickly lured into an examination of the Mexican species which approach our border, and of others which reach into the field of these, so that no arbitrary geographic limit, even, could be fixed short of the Isthmus.

At the New York meeting of the National Academy of Sciences, in November, 1911, and at the meeting of the Academy of Science of St. Louis on December 18, 1911, the preliminary results of this study of the northern species were outlined, and this was followed at the Washington meeting of 1912 by presentation to the National Academy of a revision of all of the forms of *Phoradendron* recognized as occurring in continental North America. As I was then on the eve of departing for a year in the great herbaria of Europe, this revision was withheld from immediate publication so that several obscure Mexican species could be cleared up certainly, through authentic specimens, and in the hope that they might be illustrated from the types. Though the admission of Torrey's long neglected manuscript names had quite prepared me for an apparently inordinate increase in the number of differentiable species in the genus, I was not a little surprised to find, when casting my results

then into classified form, that on an average nearly two new named forms appeared for each one already admitted to our northern flora.

Notwithstanding an intention to limit my investigation to the species of continental North America, the temptation to learn the characters of the South American species proved irresistible when, at Brussels, I examined the material in the personal herbarium of von Martius, whose collections have done so much to make known the flora of Brazil; and it was not long before the genus as a whole engaged my interest, though West Indian material was given less attention than the other until at Dahlem I reached the collection of Professor Urban, who in 1897 had published a revision of all of the West Indian Loranthaceae. To my keen satisfaction, I then found that for the Antillean region very few forms were to be differentiated from those admitted by Urban, confirming my judgment that the large increase in our own flora rests rather upon previous neglect of application to them of characters which appear to be really differential, than on excessive optimism on my own part concerning their separability. The thorough study of tropical forms by Eichler in his revision of Loranthaceae for the Flora Brasiliensis, in 1868, supplemented by a reelaboration of available material when Urban monographed the West Indian forms, has also prevented an increase in the number of South American species at all comparable with that within our own region, though the number of names added is relatively greater than for the Antilles. The general results of the study as now published were laid before the Chicago meeting of the National Academy in 1915, and printed in brief form in the initial number of the Proceedings of the Academy.*

NOMENCLATURE

In the following treatment, synonymy has been confined to citation of the original publication of each species and of its synonyms, except for its inclusion in either of the classic publications on the genus and for reference to all published illustrations. No effort has been made to rectify the frequent use of inapplicable or inaccurate names in references to the plants in periodical literature, or in the earlier floras before *Viscum* and *Phoradendron* were differentiated, except in a very few cases where more than one species was clearly referred to under a new name. To anyone needing to make corrections, the way is rendered comparatively clear by the full citation of localities and collectors which follows the description of each species.

The names employed for the plants are intended to be conformed to the international rules adopted by the Vienna Congress of 1905

*Trelease, W. *Phoradendron*. Proc. Nat. Acad. Sci. vol. 1. p. 30-35. Jan. 1915.

except that in one or two cases—notably that of the plant usually known as *P. latifolium*—the American principle “once a synonym always a synonym” has led to the adoption of a specific name of more recent origin than that first used when the latter, under *Viscum*, was preoccupied, even though it does not appear elsewhere under *Phoradendron*; and in two or three instances—*e. g.* what is here called *P. Engelmanni*—a new specific name has been preferred even though an existing or lapsed varietal name might have been used in a specific sense. An embarrassing difficulty is introduced through Professor Urban’s otherwise unimpeachable publications in the latinization of the customary Greek generic name *Phoradendron* into *Phoradendrum*, which compels a monographer to choose between recombining the names of all of Urban’s species under the former or recombining the still larger number of earlier and classic names under the emended generic name. I have felt that of the two regrettable courses the former is preferable; and customary practice retains numerous other generic names with the Greek ending.

HISTORICAL SUMMARY

The exclusively American genus *Phoradendron* was differentiated in 1847 from its Old World equivalent, *Viscum*, by Nuttall, its essential characters being trimerous flowers in simple spikes, with contiguous fruiting sepals, as contrasted with tetramerous solitary or simply cymose flowers and distinctly separate sepals in *Viscum*. Almost simultaneously with Nuttall, Engelmann recognized the generic separability of these New- and Old-world mistletoes, and segregated the latter under the name *Spiciviscum*. Before his description was printed in 1849, however, Nuttall’s paper had appeared, so that Dr. Gray, to whom Engelmann’s manuscript had been sent, though publishing the name *Spiciviscum* treated it as a synonym of *Phoradendron*, and only one species has ever been seriously named under Engelmann’s proposed genus.

Except for a few which Humboldt, Bonpland and Kunth had placed in *Loranthus*, all of the species now referred to *Phoradendron* which had been published prior to Nuttall’s segregation of the genus had been described as species of *Viscum*, so that, so far as they antedate the appearance of de Candolle’s monograph of Loranthaceae in the *Prodromus*, they were brought into position under *Viscum* in that work. Nuttall himself named a number of these as pertaining to his new genus and indicated clearly that this was probably equally true of most if not all of the American species of *Viscum*. Apparently unacquainted with the publications of Nuttall and Engelmann, Miers in 1851 suggested that the South American species of *Viscum*, with anthers dehiscent by slits, were not cogenetic with the European species, the anthers

of which dehisce by numerous pores, and for the former he proposed the name *Allobium*; but under this no species have ever been named.

Antedating Nuttall's publication of *Phoradendron* by seven years, the name *Castrea falcata* A. St. Hil. (or *Castra* as Eichler writes it) is to be accounted for, as *Castrea* has been held to be a synonym of *Phoradendron*. The publication is of an unfortunate kind. Treating of the stamen in his *Leçons de Botanique comprenant principalement la morphologie végétale*, Auguste de Saint Hilaire in 1840 says (p. 451) "Comme on voulait absolument trouver dans toutes les plantes des étamines, ou du moins des anthères, on a dit que le *Viscum album* avait une anthère adnée au pétale (*anth. adnata*): mais, pour qu'il en fût anisi, il faudrait qu'il y eût tout à la fois pétale et anthère, et ici il n'existe réellement qu'une corolle (f. 334) dont la substance s'est, à de petits intervalles, changée en pollen de manière à faire paraître alvéolée la surface intérieure des pétales. Il y a plus encore: dans une plante brésilienne de la même famille que le *Viscum album*, plante où trois pétales sont soudés à leur base, je cherchais vainement les étamines, lors que je m'aperçus que le pollen était niché dans un pore qui se trouve à l'extrémité pointu de chaque pétale (*Castrea falcata*, f. 335); et, par conséquent, ici bien plus clairement encore que dans le *Viscum*, c'est le pétale qui tient lieu d'étamine, ou, pour mieux dire, une très-petite portion de la substance intérieure du pétale s'est changée en pollen. Dans les étamines ordinaires, le métamorphose est plus complète: voilà la différence." Again, on page 873, explaining the illustration on his plate 88, the writer says "dans le *Viscum album*, fig. 334, la substance de tout le pétale se métamorphose par intervalles en poussière fécondante, de manière à faire paraître alvéolée la surface supérieure du pétale;—chez le *Castrea falcata*, fig. 335, une très-petite portion de la substance du pétale s'est changée en pollen, et celui-ci se trouve niché dans un petit trou qui existe au sommet de chacune des trois parties de la corolle." In the index of plant names at the end of his volume, *Castrea falcata* is marked definitely as of the author by the attachment of his initials "A S H".

It is scarcely probable that any botanist will ever consider the genus *Castrea* sufficiently characterized on such a description of its stamens to enter seriously into nomenclature, and no material is known to exist by which the species referred to as *falcata* may be ascertained.

Still earlier, in 1839, Korthals had segregated these American mistletoes under the sectional name *Baratostachys* without removing them from the genus *Viscum*, and so late as 1910 *Baratostachys* was accorded generic rank by Uphof,—a procedure not likely to meet with acceptance under existing nomenclatorial practice.

The principal contributions to our knowledge of the genus in recent

times are by Oliver, who determined the Mexican and Central American collections of Liebmann and Oersted; by Eichler, who took note of extra-territorial forms when revising the Loranthaceae of Brazil; and by Urban, who rendered a similar service in connection with his study of the family as represented in the West Indies.

ANALYSIS OF CHARACTERS

A few contrasts may make evident some of the differences between species in this genus which may be accepted as characters in their taxonomy. The partial or complete neglect of these characters, to the preference of the more usually employed differences in shape of foliage, etc., explains the insufficiency of such earlier treatment as that of the elder de Candolle in his very clean-cut elaboration of *Viscum* in the *Prodromus*, in 1830, and accounts for the confusion of our own species by the usually very accurate and acute Engelmann; and their tacit or explicit recognition underlies the masterly work of Eichler and Urban in revisions respectively of Brazilian and West Indian forms. That these differences have been neglected so generally depends rather on their seeming insignificance than on difficulty in seeing them.

COLOR.—How generally the color of normally vegetating mistletoes offers differential characters remains to be recorded. As is true of all of the species of the related genus *Arceuthobium* or *Razoumofskyia*, a number of the species of *Phoradendron* that grow on conifers, *e. g.* *P. juniperinum*, *P. densum*, etc., are of an olive or brownish shade, the West Indian *P. flavens* gets its name from a very striking yellow coloration, and some of the mistletoes that reach our market at Christmas time, *e. g.* *P. macrophyllum*, possess a very beautiful golden coloring, perhaps as the result of a partial etiolation after collection; but the prevailing color appears to be green, more or less dulled or shaded by a tinge of gray or olive.

HABIT.—No doubt personal familiarity in the field with the different species of *Phoradendron* will reveal several differences in aspect that cannot now be used in their characterization, for even limited acquaintance with them in nature shows that they are far from uniform in habit of growth. For the present, however, it can be said only that in this respect most species of *Phoradendron* resemble the common European *Viscum* in their bunched tufts, so that a winter picture of either may easily be mistaken for that of the other (Pl. 1). A marked exception is found in some of the desert mistletoes, like *P. californicum* and *P. Libocedri* (Pl. 2), which when seen from a distance sometimes suggest the cactus genus *Rhipsalis* in their long pendent tufts: and the Mexican *P. calyculatum* and a few other species form wide-spreading fountain-like masses of still greater size.

STEM.—Though it frequently happens that only one of the two opposed buds at a node develops into a branch, so that a pseudodichotomous forking may appear, the greater number of species, including all of those in our own flora, are monopodial or percurrent in their growth; but a comparison of *P. flavens* and *P. racemosum*, for example, among the West Indian species, shows that in the former the percurrent growth is very constant, while in the latter the main axis is so rarely continued that forking, or, through accessory development, fasciculation of the stems is all but the universal rule. In *P. cymosum* and a group of related species the suppression of the main vegetative stem is further accentuated through its replacement by a flowering spike, so that the seeming dichotomy of *P. racemosum* is here replaced by a cymose forking.

While all of our own species have a terete or nearly terete stem, squarish in some of the mountain forms, such a species as *P. vernicosum* presents the phenomenon of its compression into an elliptical cross section below the nodes; in *P. carneum*, etc. it is sharply 2-keeled: in *P. peruvianum*, etc., it is convexly sword-shaped, and it becomes 2-winged in *P. dipterum* or even very thin and broad in *P. platycaulon*. *P. rubrum* and many other species have a comparable sword-like compression accompanied by a rhombic keeling of the broad surface, with extremes from little to marked widening reaching its culmination in the very broadly winged stems of the Mexican species which Hooker mistook for *Viscum falcatum* (Pl. 62, 63). *P. trinervium* and a number of other tropical species have this rhombic keeling amplified into a sharply and nearly equally 4-angled character, which in *P. tetrapterum* and a few others develops into a strong and often undulate winging. As a rule these stem peculiarities are most evident on the uppermost internodes of a branch; sometimes they disappear entirely as the stem ages, or are represented by a faint lining on otherwise nearly or quite terete older internodes: in one species, *P. paradoxum*, terete-based and ancipital internodes regularly alternate in the branches.

LEAF.—If, as is the case, leaf-form in this genus varies in the same species or even on the same branch so greatly as to prevent its use with precision for the differentiation of closely related forms, and though identical shapes may be presented by the leaves of species not at all related, the foliage of a given species comes with familiarity to present a collective effect that is characteristic so far as it goes. Knowledge of the species when growing is certain to reveal very marked differences in texture, veining, and direction of the leaves which are lost or uncertain in the herbarium; but even in dried specimens many foliage characters may be picked out. In *P. Eggersii* and a relatively small number of other species, distinct clean cut petioles are found, while in

others, like *P. affine*, the leaves are technically sessile; but in the greater number the leaf is attenuated into what almost equally well may be called a winged petiole or a subsessile base. In one group only, that of *P. amplexicaule*, the base or petiole is dilated or clasping at its insertion.

Comparison of two such species as *P. flavens* and *P. racemosum* reveals a marked contrast in the position of the principal nerves which are found in all of the larger leaves in this genus,—the former being distinctly basinerved, and the latter pinnately veined. Occasionally, as in *P. chrysocladon*, the stronger of the nerves in one of the former group gives off a few fine or indistinct lateral veins: in *P. Eggersii*, *P. peruvianum* and a few others the midrib, strong and heavily branched below, disappears below the middle of the leaf; and in a very few cases the vascular group of the petiole continues for a short distance into the expanded blade before breaking into its component bundles to form the nerves of the leaf.

Great differences are found in leaf texture and venation, but as a rule species that are closely related differ little in this respect. The terminology of such characters when observed in the herbarium is likely to prove misleading when applied to fresh material, but however it may be corrected to suit the latter it will always prove necessary when future collections are compared with the types to which they correspond. As an illustration may be cited our common eastern mistletoe, *P. flavescens*, which possesses rather fleshy leaves with heavy somewhat raised nerves when fresh or wilting, but appears subcoriaceous in the herbarium; while the related *P. villosum* of the West Coast is rather coriaceous even when fresh. As examples of some of the extremes in this respect shown by herbarium material, may be noted *P. undulatum* and the aggregate of forms commonly called *P. latifolium*, in which a heavily raised midrib is seen beneath, while some difficulty may be found in distinguishing its pinnately placed branches: *P. robustissimum*, in which the nervation is very inconspicuous in the opaque closely papillate leaves: the group of Andean species which I am calling "Andinae", in which the leaf dries thin with sharply raised fine nerves: and *P. flavens* and its allies, which are finely nerved and venulose and wrinkled above, while beneath they are smooth and dull except for the nerves which project heavily, at least toward the base. How far the fleshiness of both stem and leaf varies in fresh material can be inferred only for most species; but the rugulose upper surface of the leaves in those last mentioned and in the Brazilian *P. chrysocladon* no doubt will find ready explanation in structure, as will the very heavy wrinkling of the stem in *P. fragile* and other species and its uniform fine cross-striation in *P. Fici* and one or two others.

INFLORESCENCE.—The essential characters of *Phoradendron* in its group of Loranthaceous genera are chiefly its axillary spikes of small unisexual and monochlamydeous sessile flowers (Pl. 5-6), often sunken in hollows of the frequently swollen internodes of the rachis and normally trimerous (Pl. 7), with 2-celled longitudinally dehiscent anthers. A very few species, like *P. cymosum*, present the phenomenon of a terminal spike corresponding to the 1- or few-flowered cyme of the old world *Viscum*, but in addition to axillary spikes. Except in the species taken by Hooker for *falcatum*, the receptacular cups, which range from so shallow as hardly to surround the base of the flower to a depth covering a noticeable part of the mature fruit, are essentially even on their margin; but in this species the cup is sometimes parted so as to present the appearance of a deeply divided calyx. The flowers,—with a small vestigial nectar gland and apparently adapted to pollination by such short-tongued insects as flies and small bees,*—are usually yellowish green when expanded, but in *P. Brittonianum* and some of its relatives the sepals are blood-red even before anthesis. Some species are known to be apogamous† and apogamy is to be expected in many others, a circumstance very probably connected, as in *Taraxacum* and *Hieracium*, with polymorphism or close affinity in species as now understood. So far as I know, polyembryony, recorded for *Viscum* and *Arceuthobium* or *Razoumofskyia*,‡ has not yet been observed in *Phoradendron*.

While the number of internodes composing a flowering spike varies in most species it usually varies within small limits, and its mean appears to be available in most cases in the recognition of a species. Contrasts are afforded by *P. Libocedri*, *P. cuneifolium*, *P. emarginatum*, *P. flavescens*, *P. polygynum*, etc. Sometimes corresponding to the number of joints, sometimes to their length, and sometimes to both, the length of the spike also presents differences of taxonomic value if used not too arbitrarily, *e. g.*, in *P. emarginatum*, *P. flavescens*, *P. macrothomum*, and *P. polygynum*. In all of our own species the plants are strictly dioecious; and, as a rule, staminate spikes are longer than pistillate and bear more flowers (Pl. 5). This is known to be true also of a number of tropical species, such as *P. Wattii*; in others, prevailing if not exclusively staminate and pistillate spikes showing something of the same dimorphism occur monoeciously on the same plant. Though usually not too closely applicable as between related species, the number and

*Honey and pollen are said to be gathered from some species:—Richter, Bull. 217, Calif. Exper. Sta.—Sholl, Bull. 102, Texas Exper. Sta. The staminate flowers of *P. villosum* are said to have the odor of pond lilies, by Piper and Beattie, Flora of the Northwest Coast, p. 124.

†*Cf.* York, Bot. Gaz. vol. 56. p. 201.

‡*Cf.* Weir, Phytopathology. vol. 4. p. 385.

arrangement of the flowers on a given spike present equally characteristic differences, but with the qualification that flowers of the uppermost joints may be fewer in number and simpler in grouping than below, while one or two of the lowest joints may be partly or entirely without flowers,—the lowermost almost universally being reduced to a sterile peduncle. The greater number of tropical species differ from those of the north in being androgynous through the occurrence of a number of staminate flowers on spike-joints that are otherwise pistillate, or, less commonly—and sometimes differentiated by the term “gynandrous”, through the occurrence of a few pistillate flowers on otherwise staminate joints, as many of Eichler’s accurately drawn plates show very beautifully. Except in a broad way, these differences do not appear to be practically applicable in contrasting species, though representing in part morphological differences of fundamental taxonomic value.

The prevailing grouping of the flowers is in 2, 4, or 6 series on each joint of the spike, *i. e.*, in 1, 2, or 3 ranks over each of the two scales by which it is subtended. Examples of the first and last are given by *P. laxiflorum* (2), and *P. flavescens* (6), and where the joints are unisexual these numbers commonly prevail, though four series may be found by reduction and as many as ten by increase when the number is typically six. When the joints are androgynous, the staminate flowers often occur at top between the normal ranks over each scale, and this condition is usually accentuated on luxuriant spikes and sometimes on all by the downward intrusion of a partial or complete third series over each scale. For the separation of the groups into which species fall, I have found it most convenient to use the prevalence of 2 or 6 series of flowers on the joint as a differential, providing as an intermediate the prevalence of the interjected two series under the designation 4+2. A glance at *P. domingense* (2), *P. trinervium* (4 or 4+2), *P. hexastichum* (6) and *P. Lindavianum* (6 to 10) will make these distinctions evident,—more than 6 ranks being very unusual except in some tropical species with leaves venulose above and dull beneath, and in some of our northern forms.

FRUIT.—Unfortunately the mature fresh fruit of few species is sufficiently well known to make its description satisfactorily possible, and species that are now widely separated or brought into juxtaposition may come to rest elsewhere when subjected to the test of this character. The mistletoes with which we are acquainted in our eastern woods or which come to our Christmas market owe their attractiveness to translucent white berries (Pl. 24), sometimes shaded greenish yellow or creamy,—a color often changing in drying for the herbarium into a sometimes seemingly glaucous blue-black, as appears to be the case with such of the tropical species as have clear white fruit. In contrast, the desert mistletoes, *P. californicum*, and its conifer-inhabiting allies (Pl. 4), produce honey- or straw-colored berries, more or less tinged with red, and such

tropical species as *P. chrysocarpum*, said to have white or yellow berries when fresh, have the fruit represented in the herbarium with a dull leathery looking surface, the epidermal cells of which have a brassy glint as on other young parts of these plants. The pulpy red berries of *P. rubrum*, more or less blackened when dry, are distinctly reticulate under a lens by the outlines of their small epidermal cells, and if, as in *P. commutatum*, these are convex, a velvety-dullness is imparted by them to the surface. *P. emarginatum* and its allies, as well as *P. Eggersii* and a few other tropical species, have the surface of the fruit distinctly warty: such warts may be more or less confluent into wrinkles, and in *P. Grisebachianum* the pulp becomes very deeply wrinkled. This suggests a range of characters as yet to be made out with sufficient certainty for safe application as differential. Another fruit character that will doubtless prove of much taxonomic value should be derived from the seed and its investing coat of fibres (Pl. 10), between which and the outer skin lies the mass of viscid pulp for which mistletoes have long been known: in shape and size this appears to differ considerably when different species are compared, but its utilization must rest on comparative study of the mature fruits of many species. In most species the ripe fruit is globose, often varying into ellipsoid as in some of our southern mistletoes, or egg-shaped, as in *P. chrysocarpum*,—depressed and elongated modifications of these forms being frequent. Sometimes, but it is hard to tell how constantly or characteristically, a short neck with sub-parallel sides is noticeable, as in *P. californicum* (Pl. 8). Rarely, as in *P. acinacifolium* and its allies, the fruit is distinctly elongated, the ellipsoid or ovoid fruits of other groups being not much longer than thick, and in *P. trinervium*, which ultimately has nearly globose berries, the partly matured fruit is similarly lengthened. Usually the berries are glabrous, but in some of our western species they or their sepals are somewhat hairy; and *P. Robinsonii*, *P. Palmeri*, and a few other tropical species, have retrorsely hirsute berries. When the fruit of *P. villosum* is compared with that of *P. flavescens*, the sepals with which the berry is crowned are seen to be ascending and somewhat separated in the former, but closely inflexed and meeting in the latter,—a difference observable everywhere, the erect or widely parted sepals of such species as *P. acinacifolium*, *P. trinervium* and *P. Eggersii* being especially noticeable (Pl. 8, 9).

SCALES.—One of the characters most available and significant in the classification of the species of *Phoradendron* is a fundamental difference in their leaves. By far the larger number of species have unmistakable foliage, but our western group to which *P. californicum* and *P. juniperinum* belong have their leaves reduced to short thin scales (Pl. 4) which resemble those of the related genus *Arceuthobium* or *Razoumofskya* so

closely that species of either genus are commonly to be found in herbaria as representative of the other. Unlike typical foliage leaves, these scales do not disarticulate, though a constriction at the base of the scales in two forms (Pl. 3) affords partial ground for their specific recognition: one species of the Mexican mountains, *P. minutifolium*, has almost equally small if fleshy disarticulating leaves: and two of the South American species, *P. tunaeforme* and *P. fragile*, are characterized by bearing small scale-like leaves only,—a character also encountered in the related genus *Dendrophthora*.

CATAPHYLS.—If any species of the United States, for example *P. Eatonii* of the everglades of Florida, is compared with any West Indian or South American species, for example *P. rubrum* of the Bahamas, the latter will be found to possess constantly in addition to its foliage one or more pairs of scale-leaves at least on the lowermost joint of every branch. Comparable with the scales of the flowering spikes and with the stem-scales of *P. juniperinum* etc., these cataphyls afford by their presence or absence what proves to be one of the most important characters for the primary division of the genus *Phoradendron*. Usually cataphyls do not subtend flowers or spikes, apparently serving no function further than the protection they may afford the shoot in its earliest development; but in *P. crassifolium* and *P. craspedophyllum* spikes are regularly and characteristically found in the axils of some of the cataphyls, and less characteristically in a few other cases.

Never found in any species of the United States, absent from three-fourths of those of Mexico and Central America, but invariably present in all of the South American and West Indian species, these scales are usually confined when present to the basal joint of each branch, though in cases of true or cymose forking they are found on all joints—since only basal joints are then present. In a very small percentage, only, of the tropical species with percurrent or monopodial branching, *e. g.* *P. flavens* and *P. crassifolium* and their allies, cataphyls are found on all foliage internodes; and in a single known species, *P. paradoxum*, the stem is made up of rather terete joints with cataphyls and ancipital joints without them, in regular alternating succession.

PARASITISM, HOSTS AND ENEMIES

All of the species of *Phoradendron* are parasitic. In the rather few cases in which they are considered as noxious parasites interest centers about the trees on which they occur, though their fruit is said to be poisonous*. Unfortunately the hosts of a very large part of the tropical

**Cf.* Bray, W. L. The mistletoe pest in the southwest. Bull. no. 166, Bur. Pl. Industry, U. S. Dep. Agr. 1910.—Hedgcock, G. G. Notes on some diseases of trees in our national forests.—V. Phytopathology. vol. 5. p. 175-181. June 1915.—Pammel, Manual of poisonous plants. p. 106, 415-6, 836. f. 196.

species remain to be noted and observers and collectors who interest themselves in the genus in the future will do well to pay particular attention to this point.

So far as I know, none of the representatives of this genus attack either tree ferns or Monocotyledons, and relatively few are found on Conifers: the majority affect woody Dicotyledons. Though sometimes, as in the case of our common mistletoe *P. flavescens*, occurring on a number of unrelated hosts, most of the species appear to be restricted in this respect, though to what extent is to be shown, rather than inferred from the scanty information now at hand. The oak, known in connection with the European mistletoe rather from its infrequency as a host than because it is often seen to support the parasite, is one of the most frequently attacked trees on our own continent except in the Northeast; and in the Southwest the sycamore, mesquite, cottonwood, hackberry and elm are much parasitised. Though the European *Viscum* sometimes occurs on Conifers, these trees, which support the related genus *Arceuthobium* or *Razoumofskyia* in abundance, appear to be attacked by only a limited number of species of *Phoradendron* which constitute a well-limited group, the "Pauciflorae," and this group is strictly confined to Conifers except for one species, *P. californicum*, which affects a variety of Angiosperms but no Gymnosperms, and *P. Bolleanum* which, in addition to coniferous hosts, has been collected on *Arbutus*. The succulent Cactaceae support one species, *P. Kuntzei*.

Secondary parasitism is not at all unknown in the genus, though restricted to its tropical species, one group of which, the "Amplectentes," exhibits this trait markedly. Except when they serve as hosts for other mistletoes, the Phoradendrons do not appear to suffer much from the attacks of parasites. I have seen a single collection (*P. antillarum*) in which a mistletoe was overgrown by *Cuscuta*. Few fungi are known for them even when dead;* and the number of insects known to attack them is very limited,† though some southwestern collections are badly infested by scale insects.

ORIGIN OF THE GENUS

Questions as to the origin of families like the Loranthaceae are doubly difficult because complicated by parasitism and attendant reduction. Of a group of families with little-differentiated ovules and seeds which Van Tieghem has brought together under the name "Inséminées," the Loranthaceae give every indication of tropical Asiatic origin, and the family

**Cf.* Saccardo, *Sylloge Fungorum*,—host index.—The related genus *Arceuthobium* is likewise free from fungi.—*Cf.* Weir, *Journ. Agr. Research*. vol. 4. p. 369.

†*Cf.* Schwarz, *Proc. Entomol. Soc. Washington*. vol. 4. p. 397.

extends around the earth in the warmer zones, reaching well toward the limits of the cool-temperate latitudes in both hemispheres. Increasing knowledge of its forms has gradually led not only to the segregation of as markedly different genera as *Viscum* and *Phoradendron*, *Loranthus* and *Psittacanthus*, etc., but to recognition that nearly all of the genera are exclusively either of the New World or of the Old World—the most marked exception being the small and simple genus *Arceuthobium* or *Razoumofskyia*, with American, European and Asiatic species.

These facts point to anything but a recent migration of American and European stocks from the original center of distribution; at the same time they do not point to a very ancient origin for our own genera. Perhaps because of their very common occurrence in upland regions—though *P. flavescens*, for instance, may be found in the greatest abundance on trees in swamps or river bottoms—and even more because of their generally fleshy substance with relatively little lignification, our mistletoes have scarcely left fossil remains, one Tertiary species, only, *P. fossile* of Ecuador, being recorded as thus far recognized in the genus *Phoradendron*. Everything considered, the genus may be regarded as probably of late Tertiary origin in the New World. When and where on this continent its two primary subdivisions came into existence will make a fascinating subject for future study.

RANGE OF SPECIES

In the geographic distribution of its species, *Phoradendron* is rather unusually instructive. The genus is strictly American and extends from Washington, Southern Colorado, the mouth of the Ohio River and Southern New Jersey to the mouth of the La Plata on the continent, and through the entire West Indian chain: one species occurs in the Pacific island Guadalupe, and two are found in the Galapagos group of Pacific islands—both oceanic but with American floras. None of its many species of fairly homogeneous character possesses a very wide geographic range. Marked examples of wide-spread occurrence are afforded only by such polymorphous species as what is usually called *P. latifolium*, or an assemblage of intricately related if differentiable species like that usually known as *P. rubrum* or *P. quadrangulare*, which range from Brazil to Central Mexico and well through the West Indies. Few species, indeed, equal in absolute range our native *P. flavescens*, which occurs from southern New Jersey to the lower Wabash, Oklahoma and eastern Texas, reaching southeast to the gulf and ocean.

Admirably endowed with means of free dissemination through their berries with extremely viscid pulp, which leads to their dispersal by birds, these mistletoes seem limited nevertheless to a surprising extent by

ordinary barriers to plant migration.* Like the similar European *Viscum album*, with its scarce-definable races capable of effective germination only on the host-species from which the seed came, our eastern *P. flavescens* though attacking a large variety of plants is usually found confined to a single host in a given region, and such experiments as have been made on it show that it can be transferred from one host to another with difficulty if at all. How far this may be concerned in the polymorphism of this species and how far its like may serve to limit the dispersal of most species, is at present a matter of conjecture only.

Viewed on broad geographic lines, the species of *Phoradendron* usually occupy areas that present severally an assemblage of fairly uniform meteorologic features with limiting environment,—in this respect agreeing with most other plants and with animals. The regions in which the species of *Phoradendron* occur or which, like the great valleys of South America, separate them, are indicated on the accompanying map. Few species range throughout any one of these regions, and it is very rare for a species to reach from one into the other.

TAXONOMIC SUMMARY

Briefly summarized, the purely taxonomic part of my study of the genus leads to the conclusion that *Phoradendron* may be best divided into two primary groups, respectively constantly without and constantly with cataphyls on their foliage shoots: for the first I am using the name Boreales since its species alone are represented in the north; and for the other, Aequatoriales since only its species are found in the equatorial region. Species destitute of expanded foliage are found in each group in small numbers. Those of the first group are pubescent for the most part, while only two of the second group are more than papillately roughened. The Boreales appear to be strictly dioecious; the Aequatoriales for the most part, though not exclusively, are monoecious, usually with some or all of their spikes androgynous.

So far as shown by the material now contained in the great herbaria at Washington, New York, St. Louis, Brussels, (where von Martius' personal herbarium is), Copenhagen, Kew, Munich (where von Martius' official collection is), Geneva, Buda Pest, Prag and Dahlem, and in many smaller collections, I find a total of 277 differentiable forms of which I regard 240 as species, and of which 66, or 23 per cent., are of the Boreales and 211, or 77 per cent., are of the Aequatoriales.

The distribution of the main groups (forms which occur in more than

*Hedgecock believes light to be a very important factor in determining their spreading,—Journ. Wash. Acad. vol. 3. p. 265; and *Viscum* is known to need light for germination.

one region being included in each) is:—Boreales: Total 66; United States 28; Mexico 48; Central America 2; West Indies 0; South America 0. Aequatoriales: Total 211; United States 0; Mexico 29; Central America 20; West Indies 38; South America 134.

Of the Boreales 41, or two-thirds, and of the Aequatoriales 87, or two-fifths, are now characterized as new. A very large percentage of the forms that have been accorded specific rank by earlier writers are still kept up even though they had passed into synonymy. Later studies, especially in the field, in the light of the conclusions now reached, may be looked to with confidence not only to bring to recognition many species not yet collected, but to make possible the trustworthy subordination or merging of some of the forms that are now held for species. As my study has proceeded, I have had the satisfaction of finding my own opinion in accord with the view of a number of the most experienced systematists, that in a monographic assemblage such as is here offered no lasting harm can come from the most radical segregation of forms possible on morphologic and geographic considerations, while on the other hand a blending of widely dissociated forms or of such as differ greatly in their extremes though without as yet definable breaks in the series, *e.g.* *P. piperoides*, leaves the work to be taken up once more from the very foundation, and with reference to all of the original materials that may have survived.

ILLUSTRATIONS

To any one who has ever wished to compare an American mistletoe with an authentic illustration, it has become evident at once that such illustrations scarcely exist apart from the superb plates on which Eichler figured many of the Brazilian species. It has been my aim to picture the more essential features of every species without alteration of size, by aid of the camera, and if possible from type specimens—not only of the species as accepted but of forms which have been given names that have passed into synonymy. That every species has been figured, and that scarcely a half-dozen types, even of synonyms, are unpictured, may be my excuse for adding that words are lacking to express adequately my gratitude to the many botanists of Europe and North America who have opened their collections to me without restrictions, and in some cases have allowed type material to follow me across the Atlantic or have replaced photographs which were unsatisfactory in the first instance. That the manuscript now completed for publication pictures for the first time 237, or nine-tenths, of the recognized forms, shows more clearly my debt to these friends than can be stated in any other words.

The University of Illinois,
January, 1, 1916.

MONOGRAPH OF PHORADENDRON

GENERIC DESCRIPTION

Parasitic more or less fleshy suffruticose perennial exogens, usually brittle at the nodes. Leaves opposite, usually petioled or petiolately contracted, in a few species reduced to scales. Inflorescence of axillary or sometimes also terminal mostly several-jointed spikes. Flowers sessile, usually sunken in the rachis, in 1 or usually 2 to 3 or occasionally 5 series over each of the opposite scales in which the joint below ends, small and inconspicuous, apetalous, dioecious or monoecious, 3- or occasionally 2-, 4-, or 5- merous: sepals distinct, deltoid, valvate, persistent on the fruit: stamens inserted on the base of the sepals with nearly sessile 2- celled anthers dehiscing by subapical slits or pores: ovary inferior, 1- celled, 1- ovuled: style short with scarcely dilated terminal stigma. Fruit baccate, with a single albuminous seed surrounded by a loosely fibrous endocarp and an extremely viscid mesocarp.—*Phoradendron* Nuttall, Journ. Acad. Philadelphia. ser. 2. vol. 1. p. 185. 1847.—*Spiciviscum* Engelm. in Gray, Mem. Amer. Acad. n. s. vol. 4. p. 58. 1849.—*Allobium* Miers, Ann. & Mag. Nat. Hist. ser. 2. vol. 8. p. 178-9. 1851.—*Baratostachys* Uphof, Pflanzengattungen. p. 173. 1910.

PRIMARY DIVISION OF THE GENUS

Without cataphyllary scales.

BOREALES.

With cataphylls at least on the basal internode of each branch.

AEQUATORIALES.

I. BOREALES.

Stems without cataphylls or scales toward the base of the branches, never dichotomous though sometimes with one lateral branch developed so as nearly or quite to equal the main axis, scarcely ever sharply angled or 2-edged. Spikes axillary, never terminal. Flowers dioecious, the staminate and pistillate spikes often dissimilar. Confined to continental North America; characteristic of the northern Mexican tableland and the southern and western United States, only two species reaching into Central America.

Branches never winged: receptacular cups not lacerate.

Pistillate flowers 2 on each joint. Chiefly on conifers.

PAUCIFLORAE.

Pistillate flowers 6 or more on each joint.

PLURISERIALES.

Branches broadly winged: receptacular cups often cleft into sepal-like segments: pistillate flowers numerous. CALYCVLATAE.

A. PAUCIFLORAE.

Stems not winged. Spikes short, 1- to 4-jointed, each joint with 2 opposite flowers when pistillate or with 4—8 or 12 flowers in 4 or 6 series when staminate: receptacular cups not calyx-like. Berries subglobose, smooth and glabrous, small (3-4 mm.), tinged reddish or straw-colored. Western United States, and Mexico as far as Mt. Orizaba. All except the first species occur on conifers.

Leaves represented by short thin scales, not disarticulating.

APHYLLAE.

Leafy, or in the first with scale-shaped but disarticulating leaves.

BOLLEANAE.

1. APHYLLAE.

Leaves represented by short thin scales not disarticulating from the stem. Essentially confined to the desert and western mountain region of the United States. Frequently confused by collectors with the Viscoid genus *Arceuthobium*.

Canescent: twigs terete: spikes several-jointed: sepals meeting in fruit. *P. californicum*.

Glabrous: twigs often bluntly squarish: spikes 1-jointed: sepals usually parted in fruit.

Scales not constricted at base: stout. On *Juniperus*.

P. juniperinum.

Scales obscurely constricted: slender and pendent. On *Libocedrus*.

P. Libocedri.

Scales constricted as if by a string: compact. On *Juniperus*.

P. ligatum.

PHORADENDRON CALIFORNICUM Nuttall.

Phoradendron californicum Nuttall, Journ. Acad. Philadelphia. ser. 2. vol. 1. p. 185. 1848.—MacDougal, Publ. Carnegie Inst. no. 99. pl. 60.

Not forked, the long slender somewhat reddish branches without cataphyls, dioecious. Internodes short (1-3x10-20 mm.), from softly and closely lanate-canescant becoming glabrous. Stem-scales spreading, acute, 2 mm. long. Spikes axillary, mostly solitary, minutely canescent, long for the group (5-10 mm.), with about 4 short joints 2- or exceptionally 4- or 6- flowered in 2 or 4 series: peduncle 1-3 mm. long: scales acute. Fruit red, subglobose, often rostrate, 3 mm. in diameter: sepals nearly or quite meeting.—Plates 8, 11.

Sonoran region, chiefly on Leguminosae, never on coniferae*,—the type of the genus.—The type from California.

Specimens examined:—UNITED STATES. CALIFORNIA. Without indication of host:—Sierra Nevada (*Nuttall*, 1836,—the type). Indio (*Davy*, 45). Without locality (*Davidson*, 5929). On *Acacia*:—San Felipe Cañon (*Palmer*, 441; *Chandler*, 5456 in part). Cottonwood Springs (*Hall*, 6014). Mountain Springs (*Orcutt*, 2013). On *Prosopis*:—Agua Caliente (*Parish*, 684). Kelso (*Jones*, 1906). Calexico (*Abrams*, 3230). On *Ceanothus*:—Banning (*Toumey*, 1894). On *Zizyphus*:—San Geronio Pass (*Engelmann*, 1880). On *Larrea*:—Vallecito (*Hb. Dept. Agr.*). Barstow (*Heller*, 1896). NEVADA. On *Prosopis*:—Las Vegas (*Jones*, 1905; *Griffiths*, 1912). Nelson (*Jones*, 1907). UTAH. "On juniper" [?]: Milford (*Goodding*, 1026). ARIZONA. On *Acacia*:—Williams River (*Bigelow*, 1853-4). Clifton (*Greene*, 1880). Tucson (*Coville*, 1617; *Dewey*; *Griffiths*, 3539; *Toumey*, 1894; *Hedgcock & Long*, 9814). On *Prosopis*:—Gila River (*Gilbert*, 1873; *Rothrock*, 338). Gila Crossing (*Thorner*, 14 t). Pima Co. (*Mearns*, 2724). Bowie (*Jones*, 4242 in part). Beaver Dam (*Goodding*, 2135, 2139). Oracle (*Hedgcock & Long*, 9696). On *Parkinsonia*:—Bill Williams Fork (*Bigelow*, 5 a). Tucson (*Pringle*, 1884; *Toumey*, 14, 1894). On *Cercidium*:—Near the Colorado (*Bigelow*, 5). Tucson (*Selkirk*, 9816). On *Larrea*. Bowie (*Jones*, 4242 in part). Castle Creek (*Toumey*, 291). Hardyville (*Palmer*, 506). Without indication of host:—The Needles (*Jones*, 1884). Tucson (*Lloyd*, 1907). Rincon Pass (*Griffiths*, 2019). Peach Springs (*Russell*, 1889). Without locality (*Bischoff*, 1871; *Toumey*). Santa Rita Mountains (*Griffiths & Thorner*, 205,—a dwarf form, f. *nana*—Pl. 12). MEXICO. LOWER CALIFORNIA. Ubi (*Brandege*, 1889). Gardner's Laguna (*Mearns*, 2894). San Felipe Bay (*Mac Dougal*, 1904). On *Microrhamnus*:—SONORA. Guaymas (*Palmer*, 1065). Pinacate (*Lumholtz*, 30). Tiburon Island (*Rose*, 16780). Hermosillo (*Brandege*, 1892,—a very silvery form, f. *argentea*).

***Phoradendron californicum distans*, n. var.**

Differing from the type in its elongated fruiting spikes (about 30 mm.) with distinctly separated whorls of fruit.—Plate 13.

Southern range of the type, into which it probably merges, and on the same hosts.—The type from Arizona.

Specimens examined:—UNITED STATES. CALIFORNIA. Without locality (*Bigelow*, 1853-4). Indian Wells (*Orcutt*, 2044). Resting Springs valley (*Coville & Funston*, 279). Tantillas Cañon (*Palmer*, 270, 441

*Cf. *Hedgcock*, *Phytopathology*. vol. 5. p. 179.

in part). East of San Bernardino (*Parry*, 1877). NEVADA. Logan (*Heller*, 10464). ARIZONA. Gila River (*Boundary Survey*, 1236). Fort Mojave (*Cooper*, 1860-61). Yuma (*Engelmann & Sargent*, 1880; *Vasey*, 1881; *Pringle*, 1881—the type; *Solereder*, 1893). Bonelli's Ferry (*Goodding*, 725). Beaver Dam (*Jones*, 5013). Tucson (*Jones*, 1903; *Dewey*; *Hedgcock & Long*, 9815). El Rio (*Lemmon*, 267). Nogales (*Mearns*, 2644). West of the Cerro Colorado (*Ferriss*). Franconia (*Jones*, 1903). Yucca (*Trelease*, 1901). NEVADA. Moapa (*Jones*, 1904). Muddy Valley (*Kennedy & Goodding*, 57). MEXICO. LOWER CALIFORNIA. San Rafael Valley (*Orcutt*, 1310). San Gregorio (*Brandegee*, 1889). Lake Maquata (*Orcutt*, 2027). Agua Verde (*Rose*, 16583). SONORA. S. Pedro to Fronteras (*Hartman*, 945). SINALOA. Navajoa (*Rose*, *Standley & Russell*, 13165). Topolobampo (*Endlich*, 689).

PHORADENDRON JUNIPERINUM Engelmann.

Phoradendron juniperinum Engelmann, Mem. Amer. Acad. n. s. vol. 4. p. 58. 1849.

Not forked, the moderate rather stout somewhat squarish branches without cataphyls, dioecious. Internodes short (2-4x5-10 mm.), microscopically granular. Stem scales spreading, deltoid, not constricted at base, 1-2 mm. long. Spikes solitary, very short (3 mm.), glabrous, with a single short joint 2-flowered when pistillate and 6- or 8-flowered when staminate: peduncle scarcely 2 mm. long: scales rather blunt. Fruit straw- or wine-colored, subglobose, 3 mm. in diameter: sepals erect, parted.—Plates 2, 3, 4, 14.

Southern Rocky Mountain or Chihuahuan and adjacent Sonoran regions (? exclusively) on *Juniperus*.*—The type from New Mexico.

Specimens examined:—UNITED STATES. COLORADO. Mesa Grande (*Purpus*, 2). Durango (*Tweedy*, 596-8; *Parsons*, 1897). Hotchkiss (*Cowen*, 1892). Mancos (*Baker*, *Earle & Tracy*, 92). Delta (*Hedgcock*, 9319). UTAH. St. George (*Palmer*, 1875, 1877). Tooele Co. (*Jones*, 1900). Antelope Island (*Jones*, 2081). Kanab (*Jones*, 6045). East of Gunnison (*Ward*, 360). Diamond Valley (*Goodding*, 884). Milford (*Goodding*, 1026). Ephraim (*Hedgcock*, 3993). Nephi Mts. (*Hedgcock*, 8136). ARIZONA. Bill Williams Mts. (*Bigelow*, 6). Camp Apache (*Rothrock*, 261, 814). Chiricahua Mts. (*Rothrock*, 6510; *Blumer*, 1525, 1532, 1956, 1990; *Burrall*, 1127-9). Cariso (*Brandegee*, 1234). Santa Rita Mts. (*Pringle*, 1884). Santa Catalina Mts. (*Hedgcock & Long*, 9817). Ft. Huachuca (*Wilcox*, 1892; *Toumey*, 1894, 1895). Benson

*Cf. *Hedgcock*, *Phytopathology*. vol. 5. p. 179.

(Vasey, 1881). Moki Reservation (Hough, 18, 87). Graham Co. (Coville, 1946). Williams (Toumey, 292). San Francisco Mts. (Sitgreaves, 1851,—a dwarf, slender form, f. *nana*—Pl. 14; Knowlton, 188; Toumey, 1894). Flagstaff (MacDougal, 142). Grand Cañon (Seler, 4731; Hedgcock, 4911; Hottes, 1914; Spaulding, 302; Toumey, 10). Bonelli's Ferry (Goodding, 725). Pagumpa (Jones, 5095aa). Cosnino (Jones, 4041). Paradise (Ferriss). Ash Fork (Hedgcock, 15980). Bass Creek (Pilsbry, 1906). Cave Creek (Pilsbry, 1906). Without locality (Bischoff; Girard; Palmer; Vasey; Kuntze, 23231). Sedona (Hedgcock, 4939). NEW MEXICO. Santa Fe (Fendler, 281, 1847,—the type; Heller, 3534). Ruckman (Hottes, 1914). Copper Mines (Thurber, 1851). Near the Zuñi (Bigelow, 3). Silver City (Greene, 1880; Hedgcock & Long, 9854). Mogollon Mts. (Rusby, 390, 7262). Fort Bayard (Mulford, 374; Hedricks, 180; Johnson, 8270, 8279; Munro, 15112). Fort Wingate (Matthews, 1883). Socorro (Plank, 1895). Gray (Skehan, 1899). Hermosa (Wooton, 2866). Lincoln Co. (Wooton, 386). Queen (Wooton, 1909). Organ Mts. (Wooton, 1900; Ferriss). Burro Mts. (Metcalfe, 737). Grant Co. (Blumer, 95, 105, 109, 110). Gila River (Vreeland, 806). Gila Forest (Hedgcock & Long, 9862; Munro, 15111). Pinos Altos (Hedgcock, 784, 9833). Sandia Mts. (Hedgcock, 1512). North of Fierro (Diehl, 296). Cañoncito (Brandeggee, 1879). Cooleedge (Munson & Hopkins, 1889). Magdalena (Herrick, 985). Anton Chico (Griffiths, 11135). Without locality (Douglass, 1887; Wright, 1788). TEXAS. Davis Mts. (Earle & Tracy, 334). Placitos (Hedgcock, 16545). MEXICO. CHIHUAHUA. Colonia Garcia (Townsend & Barber, 164). Sierra Madre. (Pringle, 1358).

PHORADENDRON LIBOCEDRI Howell.

Phoradendron Libocedri Howell, Fl. N. W. Amer. vol. 1. p. 608. 1902.

P. juniperinum Libocedri Engelm. in Watson, Bot. Calif. vol. 2. p. 105. 1880.

Not forked, the elongated slender somewhat squarish branches without cataphyls, dioecious. Internodes short (1-2x10 mm.), cellular-granulated. Stem scales spreading, half-ovate, occasionally obscurely constricted at base, about 1 mm. long. Spikes solitary, very short (3 mm.), smooth, with a single short joint 2-flowered when pistillate and 6- or 8-flowered when staminate; peduncle 2 mm. long; scales rather blunt. Fruit straw-colored, subglobose, 3 mm. in diameter: sepals erect, parted.—Plates 2, 6, 15.

Californian region, usually on *Libocedrus*.—The type from California.

Specimens examined:—UNITED STATES. OREGON. Waldo (Howell, 1884, 1887). CALIFORNIA. Lassen's Peak (Lemmon, 1875—to be taken as type). Klamath Forest (Hedgcock, 1895). Duffield's Ranch (Bigelow,

1, 1854). Calaveras Grove (*Hutchens*, 1900; also on *Abies*). Sierraville (*Lemmon*, 1879). Tehipite Valley (*Hall & Chandler*, 527). Black Butte (*Engelmann*, 1880). Eldorado Co. (*Hansen*, 1887). Yreka (*Hedgcock*, 1898; *Pond*, 183). Amador Co. (*Curran*, 1886; *Hansen*, 74, 721). Butte Co. (*Bruce*, 687). Mariposa (*Congdon*, 1903). Sugar Pine (*Scherfee*, 1914). Wawona (*Solereder*, 1893). Yosemite Valley (*Hottes*, 1914; *Hedgcock & Meinecke*, 4805). Kern River Valley (*Coville & Funston*, 1729). Colby (*Austin*, 698). Fish Camp (*Hedgcock & Meinecke*, 4830). San Bernardino Mountains (*Parry & Lemmon*, 373; *Parry*, 877; *Rusby*, 1909; *Parish*, 970, 5071; 3005, on *Pinus*). Riverside (*Grant*, 4517). San Jacinto Mountains (*Leiberg*, 3150; *Grant*, 977; *Hall*, 2565). San Diego Co. (*Stokes*, 1895). Cuyamaca Mountains (*Orcutt*, 234). NEVADA. Franktown, Washoe Co. (*Lewers*, 1892). Lincoln Co. (? *Coville & Funston*, 307). MEXICO. LOWER CALIFORNIA. Without locality (*Brandegge*, 1893).

Phoradendron ligatum n. sp.

Not forked, the rather elongated and slender somewhat squarish branches without cataphyls, dioecious. Internodes short (2x5-10 mm.), rather prominently cellular-granular. Stem scales spreading, nearly half-round, sharply constricted-grooved at base but not deciduous, 1 mm. long. Spikes solitary, very short (2 mm.), smooth: peduncle about 1 mm. long. Fruit?—Plates 3, 15.

Californian region passing into the western Sierra Madre (? exclusively) on *Juniperus*.—The type from Oregon. The western representative of the Rocky Mountain *P. juniperinum*, from which it is scarcely separable except by its curiously constricted scales.

Specimens examined:—UNITED STATES. OREGON. Crook Co. (*Cusick*, 2637,—the type; *Leiberg*, 285; *Whited*, 3179). Klamath Lake (*Coville*, 1351). CALIFORNIA. Mono Pass (*Bolander*, 1866). Sierraville (*Lemmon*, 1875, 1879). Amador Co. (*Hansen*, 721). Plumas Co. (*Austin*, 1876). Modoc Co. (*Manning*, 58). Sisson (*Lyon*, 1905). Warren Mts. (*Griffiths & Hunter*, 405). San Bernardino Mts. (*Parish*, 1444). NEVADA. Virginia City (*Bloomer*, 1863-4). Reno (? *Hillman*, 11715). Franktown (*Lewers*). Without locality (*Clendon*, 1871; *Wheeler*, 1872; *Pratten*). MEXICO. DURANGO. Santiago Papasquiaro (*Palmer*, 79). CHIHUAHUA. Huajotitan (*Endlich*, 1164). Guachochi (*Goldman*, 178). "Sierra Madre" (? *Jones*, Sept. 23, 1903,—on *Cupressus*).

2. BOLLEANAE.

Leaves sessile, articulated with the stem, scale-like (but fleshy) in the first species only. Californian and Chihuahuan regions, extending to the Pacific island Guadalupe and the eastern Sierra Madre of Mexico in a single species each.

Leaves short, resembling scales, but thick and disarticulating: glabrous: spike 1-jointed. *P. minutifolium*.

Leaves linear-oblong.

Tomentose: spike often 2- or 3-jointed. *P. capitellatum*.

Minutely papillate or hispid: spike mostly 1-jointed.

Staminate spike about 12-flowered.

P. tequilense.

Staminate spike about 6-flowered.

P. saltillense.

Leaves somewhat spatulately linear.

P. Bolleanum.

Leaves oblanceolate-spatulate.

Spike mostly 1-jointed.

Staminate spike about 12-flowered. On *Juniperus*. *P. densum*.

Staminate spike about 8-flowered. On *Abies*, etc. *P. pauciflorum*.

Spike mostly 2-jointed: staminate spike about 6-flowered.

P. guadalupense.

PHORADENDRON MINUTIFOLIUM (Urban).

Phoradendrum minutifolium Urban, Bot. Jahrb. vol. 23. Beiblatt 57. p. 2. 1897.

Not forked, the moderately short and slender somewhat squarish branches without cataphyls, dioecious. Internodes short (1-2x10 mm.), glabrous. Leaves scale-shaped as in the preceding but fleshier, spreading, half-ovate, acute, articulated at base and deciduous, 2-3 mm. long. Spikes solitary, very short (scarcely 3 mm.), smooth, with a single joint. Fruit?—Plate 16.

Eastern Sierra Madre region (? exclusively) on *Juniperus*.—The type from Eastern Mexico. Forming a transition to the preceding group.

Specimens examined:—MEXICO. Llanos de Perote (*Schiede*, 402,—the type). Cofre de Perote (*Humboldt*,—associated with *Arceuthobium vaginatum*).

Phoradendron capitellatum Torrey, n. sp.

Phoradendron capitellatum Torrey in herb.

Viscum Reichenbachianum Seemann, Bot. Herald. p. 295. 1852-7,—as to the Wright citation only.

Not forked, the moderately long and slender branches without cataphyls, dioecious. Internodes short (1-3x5-10 mm.), at least for a time densely stellate-tomentose. Leaves narrowly elliptical-oblong or involutely linear, submucronately acute, sessile, 2x10-15 mm. Spikes solitary, very short (5 mm.), with mostly 2 rounded joints 2-flowered when pistillate and about 6-flowered in 6 series when staminate: scales somewhat hairy: peduncle suppressed. Fruit straw-colored, subglobose, about 4 mm. in diameter: sepals somewhat pointed.—Plate 17.

Chihuahuan region (? exclusively) on *Juniperus*.—The type from New Mexico.

Specimens examined:—UNITED STATES. NEW MEXICO. Without locality (*Wright*, 1787, 1851-2,—the type; *Greene*, 1880). Stein's Pass (*Toumey*, 1895). Florita Mts. (*Jones*, Sept. 1903). Alamogordo (*Rehn & Viereck*, Apr. 1902). Dog Mts. (*Mearns*, 300). Carrozalillo Mts. (*Mearns*, 172). S. Luis Mts. (*Mearns*, 2485). TEXAS. Western Texas to El Paso (*Wright*, 630, 1849). ARIZONA. Near Clifton (*Greene*, 1880). South of Flagstaff (*Drake*, 15118, 15118a). Pajarito Mts. (*Schott*, July 1855; *Trelease*, 363). White Tail (*Pilsbry*, Nov. 1906). Chiricahua Mts. (*Blumer*, 1524, 1957, 1989, 1906). Sanoita Valley (*Lemmon*, 266). Oracle (*Hedgcock*, 9685). Bowie (*Jones*, Sept. 1884). MEXICO. SONORA. Guadalupe Cañon (*Merton*, 2073; *Mearns*, 2529). S. Pedro to Fronteras (*Hartman*, 944).

Phoradendron tequilense n. sp.

Not forked, the rather long and slender branches without cataphyls, dioecious. Internodes rather short (1-2x5-10 mm.), closely papillate. Leaves linear- or oblong-elliptical, acute or mucronate, sessile, 2x10-15 mm. Spikes mostly solitary, short (4-7 mm.), nearly smooth, 1-jointed and 2-flowered when pistillate and capitately about 12-flowered, or with 2 such globose joints, when staminate: peduncle 3-5 mm. long. Fruit straw-colored, subglobose, 3 mm. in diameter: sepals conically somewhat parted.—Plate 18.

Western Sierra Madre region (? exclusively) on *Thuja*.—The type from Jalisco.

Specimens examined:—MEXICO. Sierra de Tequila, Jal. (*Pringle*, 4434, 1893,—the type).

PHORADENDRON BOLLEANUM Eichler.

Phoradendron Bolleanum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 m. 1868.

Viscum Bolleanum Seemann, Bot. . . . Herald. p. 295. pl. 63. 1852-7.

Not forked, the rather short and stout branches without cataphyls, dioecious. Internodes short (1-2x5-15 mm.), evanescently minutely and sparingly short-hispid. Leaves somewhat spatulately linear-elliptical, submucronately acute, sessile, 2-4x mostly 10-15 mm. Spikes often clustered, very short (3 mm.), somewhat hispid, the mostly single joint 2-flowered when pistillate and about 4-flowered when staminate: peduncle 2 mm. long. Fruit straw-colored, subglobose, about 4 mm. in diameter: sepals somewhat parted.—Plate 19.

Chihuahuan and Western Sierra Madre regions, usually on *Juniperus*, one specimen on *Arbutus*.—The type from Chihuahua.

Specimens examined:—UNITED STATES. TEXAS. Without locality (*Boundary Survey*, 1235; *Nealley*, 1890). Cornudas Mts. (*Havard*, 83).

MEXICO. CHIHUAHUA. Sierra Madre (*Seemann*,—the type of *V. Bolleanum*; *Endlich*, 1222; *Jones*, Sept. 1903,—a form with short leaves 2x7 mm., approaching the preceding in roughening and length of peduncle. Near San Julian (*Nelson*, 4921). Santa Eulalia Mts. (*Pringle*, 256, 1885). DURANGO. Vicinity of Durango (? *Palmer*, 778,—noted as on a Madroña, apparently *Arbutus arizonica*, and hence very aberrant in the group which is usually found on conifers). Mesa de Sandia (*Goodding*, 2149). Guanacevi (*Nelson*, 4756). TEPIC. Sta. Teresa (*Rose*, 3442).

***Phoradendron saltillense* n. sp.**

Not forked, the moderately long and stout branches without cataphyls, dioecious. Internodes short (2.4x10-20 mm.), papillate-hispid. Leaves narrowly oblong, submucronately acute, sessile, 2-3x20-30 mm. Spikes more or less clustered, short (5-6 mm.), nearly smooth, the single joint 2-flowered when pistillate and about 6-flowered when staminate: peduncle 2 mm. long. Fruit?—Plate 16.

Chihuahuan region (? exclusively) on *Juniperus*.—The type from northern Mexico.

Specimens examined:—MEXICO. San Antonio de las Alazanes, near Saltillo (*Gregg*, 399, 1848,—the type).

***Phoradendron densum* Torrey n. sp.**

Phoradendron densum Torrey in herb.

Not forked, the rather short and thick branches without cataphyls, dioecious. Internodes short (2.4x5-10 mm.), usually papillate-roughened. Leaves shortly oblanceolate, usually very obtuse, sessile, 4-6x12-15 or rarely 20 mm. Spikes sometimes clustered, very short (3 mm.), smooth, with 1 or rarely 2 joints 2-flowered when pistillate and about 12-flowered when staminate: peduncle 1-2 mm. long. Fruit straw-colored, subglobose, about 4 mm. in diameter: sepals somewhat parted.—Plate 20.

Californian and Sonoran regions (? chiefly) on *Juniperus*.—The type from California.

Specimens examined:—UNITED STATES. OREGON. Lake Co. (*Cusick*, 2260a). Klamath Reservation (*Coville*, 1352). Scott River Valley (*Pond*, 191). Klamath Co. (*Walpole*, 418; *Applegate*, 1899). CALIFORNIA. Mt. Shasta (*Wilkes Exped.*, 1567, 1838-42—the type). Near Shasta (? *Coffman*, 1913—on *Cupressus*). Duffield's Ranch (? *Bigelow*, 1, 1854). Klamath River (*Engelmann*; *Butler*, 1071). Inyo Mts. (*Coville & Funston*, 589). Geysers, Lake Co. (*Brewer*, 865). Siskiyou Co. (*Copeland*, 3542; *Walpole*, 230; *Eastwood*, 3542). Hoey (*Tillotson*, 8329). Yreka (*Engelmann & Sargent*, 1880). Lassen Co. (*Baker &*

Nutting, 1894). *Hesperia* (Trelease, 1892). San Jacinto Reserve (Leiberg, 3161). Los Angeles Co. (Elmer, 3607; Hasse; Abrams & McGregor, 543; Chamberlain). San Bernardino Mts. (Coville & Funston, 130). San Felipe (Palmer, 442). San Diego Co. (Orcutt; Mearns, 3013, 3198; Schoenfeldt, 3045). Sta. Rosa Mts. (Smith, 5483). Kentucky Springs (Davy, 205). Cuyama (Eastwood, 1896). Antelope Valley (Hough; Davy, 2603). Without locality (Kuntze, 3168). MEXICO. SONORA. San Rafael (Jones, 37032, 1882).

In the south the leaves are prevailing narrower than in the north, particularly so in *Parish*, 899, from the San Bernardino Mountains, for which the name f. *Parishii* may be used.—Plate 21. What must be taken for *P. densum* occurs also in Arizona (Sedona, near Flagstaff, *Hedgcock*, 4915 in part—on *Cupressus*).

PHORADENDRON PAUCIFLORUM Torrey.

Phoradendron pauciflorum Torrey, Bot. Whipple. p. 134. 1857. (Senate Ex. Doc. no. 78. 33d Congress, 2d Session,—Report of expl. and surv. . . . Miss. river to the Pacific. vol. 4. pt. 4, Torrey, Description of the general botanical collections).

Not forked, the rather lax and long branches without cataphyls, dioecious. Internodes long for the group (2.4x15-40 mm.), somewhat granular-varnished. Leaves oblanceolate-elliptical, submucronately obtuse, sessile, 5-7x20-30 mm. Spikes mostly solitary, very short (scarcely 5 mm.), with 1 or rarely 2 joints 2-flowered when pistillate and about 8-flowered when staminate: peduncle scarcely 2 mm. long. Fruit straw-colored, subglobose, 4 mm. in diameter: sepals somewhat parted.—Plate 22.

Californian region (? exclusively) on *Abies* and *Cupressus*.*—The type from California.

Specimens examined:—UNITED STATES. CALIFORNIA. Duffield's Ranch (*Bigelow*, 2, 1854,—to be taken as type). Mariposa (*Congdon*, 1903). Trail to Big Carson (*Eastwood*, 1897-8—on *Cupressus*). Kern Co. (*Coville & Funston*, 1192, 1891; *Davy*, 2027). Baldy Trail (*McClatchie*, 1893). Mount Tamalpais (*Eastwood*, 1898). Bear Valley, San Bernardino Mts. (*Parish*, 1443; *Jones*, 1900). San Jacinto Reserve (*Leiberg*, 3152). Cajon Pass (*Bigelow*, Mar. 16, 1854). Cuyamaca Mts. (*Orcutt*, 545). Fish Camp (*Hedgcock & Meinecke*, 4829). MEXICO. LOWER CALIFORNIA. San Pedro Martir (*Brandege*, 1893).

I do not distinguish from this, except in a somewhat longer basal attenuation of the leaves and the occurrence of about 14 flowers on each

*Cf. *Hedgcock*, *Phytopathology*. vol. 5. p. 179, for a note on the hosts of this and allied species—not clearly separated.

joint of the staminate spikes, specimens on *Abies* from the Sta. Catalina Forest Reserve, Arizona (*J. S. Holmes*, Aug. 7, 1906; *Hedgcock & Long*, 9720).

***Phoradendron guadalupense* n. sp.**

Not forked, the moderately long and lax branches without cataphyls, dioecious. Internodes moderately short (2.4x10-15 mm.), slightly papillate. Leaves oblanceolate-spatulate, very obtuse, sessile, 5-8x15-30 mm. Spikes often clustered, rather long for the group (nearly 10 mm.), smooth, with usually 2 or 3 joints 2-flowered when pistillate and about 6-flowered when staminate: peduncle 1-2 mm. long, sometimes bearing flowers. Fruit?—Plates 22, 23.

Western insular region of Mexico.—The type from Guadalupe.

Specimens examined:—MEXICO. Guadalupe Island (*Palmer*, 85, 1875,—the type: the host plant not noted).

B. PLURISERIALES.

Stems never winged. Spikes more or less elongated, 2- to 6-jointed, each joint with 6 or more flowers mostly in 6 series. Berries globose or ellipsoidal, smooth and in most species glabrous, moderately small (3 to mostly 4 or 5 mm.), white or slightly tinged with greenish yellow. The young growth at least is puberulent or hairy. Continental North America, centering about northern Mexico.

Leaves never long, usually small; shoots not flattened.

Leaves moderate. Chiefly northern.

Leaves small. Southern.

Leaves large and hairy. Southern.

Leaves long and relatively large.

Shoots not flattened.

Shoots compressed at nodes,

FLAVESCENTES.

— BRACHYSTACHYAE.

FERRUGINEAE.

VELUTINAE.

LONGIFOLIAE.

3. FLAVESCENTES.

Leaves usually relatively broad, never large or greatly elongated, very obtuse. Shoots, if evanescently somewhat square, neither acutely angled nor much compressed. United States and adjacent Mexico.

Berries relatively large (4-5 mm.), glabrous except in the last group, with sepals over one-half mm. long: leaves prevailingly oblanceolate.

Staminate spikes slender, the nearly glabrous few-flowered joints 2-7 mm. long.—Eastern.

Leaves prevailingly oblanceolate-obovate: rather stout.

Fruiting spikes short (20-40 mm.) with crowded whorls of berries.

P. flavescens.

- Fruiting spikes elongated (60-70 mm.) with separated whorls of berries. *P. macrotomum*.
 Leaves narrower, subspatulate: slender. *P. Eatonii*.
 Staminate spikes mostly stouter and longer, the rather many-flowered joints 6-15 mm. long. Southwestern, Pacific or Mexican.
 Spikes canescently tomentose.
 Staminate spikes moderate (15-20 mm.). Texan. *P. Engelmannii*.
 Staminate spikes long (40-60 mm.). North Mexican. *P. Greggii*.
 Spikes short. East Mexican. *P. thyrsoides*.
 Spikes yellow-hispid, moderate. East Mexican. *P. colipense*.
 Spikes glabrous or sparsely villous.
 Leaves rounded. *P. macrophyllum*.
 Leaves oblanceolate.
 Flowers large. New Mexican. *P. Cockerellii*.
 Flowers moderate. Desert. *P. coloradense*.
 Spikes rather canescently short-villous. Californian. *P. longispicum*.
 Staminate spikes short, the few-flowered short-villous joints scarcely 5 mm. long: fruit somewhat villous.
 Short-villous. Californian. *P. villosum*.
 Velvety-tomentose. Mexican. *P. tomentosum*.
 Minutely rusty-pubescent. Mexican. *P. puberulum*.
 Berries small (3 mm.), pubescent above, with sepals scarcely one-third mm. long: leaves prevailing rounded. Southwestern.
 Leaves moderate (often 25x30 mm.). *P. Coryae*.
 Leaves small (10x15-20 mm.).
 Spikes closely tomentose. Texan. *P. Havardianum*.
 Spikes slightly villous. North Mexican. *P. Wilkinsoni*.

PHORADENDRON FLAVESCENS Nuttall.

- Phoradendron flavescens* Nuttall, Journ. Acad. Philadelphia. n. s. vol. 1. p. 185. 1847.—v. Ettingshausen, Denkschr. Akad. Wien. vol. 32. pt. 1. pl. 2.—Britton & Brown, Ill. Fl. vol. 1. f. 1272.—Amer. Journ. Pharm. vol. 55. p. 421. f.—Coulter, Barnes & Cowles, Text Book. vol. 2. f. 1084.—Garman, Bull. Ky. Agr. Exper. Sta. no. 169. f. 12.—Bailey, Cycl. Am. Hort. 4 ed. 4:1312. f. 1766.
P. flavescens glabriusculum Engelm., Boston Journ. Nat. Hist. vol. 6. p. 212. 1850.
Viscum flavescens Pursh, Fl. Am. Sept. vol. 1. p. 114. 1814.—de Candolle, Prodr. vol. 4. p. 280.
V. leucarpum Rafinesque, Fl. Ludov. p. 79. 1817.
V. leucarpum de Candolle, Prodr. vol. 4. p. 280. 1830.
V. serotinum Rafinesque, New Fl. N. Amer. vol. 3. p. 22. 1836.
V. ochroleucum Rafinesque, l. c. p. 23. 1836.

?*V. oblongifolium* Rafinesque, *l. c.* p. 23. 1836.

V. rugosum Rafinesque, *l. c.* p. 24. 1836.

V. verticillatum Audubon, *Birds of Amer.* vol. 4. pl. 369; quarto ed. vol. 3. pl. 143.

Not forked, the rather short and stout branches without cataphyls, dioecious. Internodes rather short (2-4x15-30 mm.), like the foliage becoming nearly glabrous from slightly but not canescently tomentose. Leaves oblanceolate to obovate, very obtuse, 1.5-2 or 3 or even 4.5x2-5 cm., rather fleshy, obscurely 3- to 5-nerved or also veiny, cuneately subpetioled for about 5 mm. Spikes mostly solitary, short (10-15 or rarely 20 mm., lengthening to 25-40 mm. in fruit), at first puberulent, with about 4 short joints clavately 6-flowered when pistillate and subglobose and about 12-flowered when staminate: peduncle 2-6 mm. long: scales more or less short-pilose. Fruit white or whitish, globose or somewhat ellipsoidal, glabrous, about 4x5 mm., in approximate whorls: sepals nearly or quite glabrous, closely inflexed.—Plates 5, 24, 25.

Atlantic United States, on a great variety of Angiosperms* (*Acer*, *Gleditsia*, *Nyssa*, *Platanus*, *Quercus*, *Ulmus*, etc.), of which it most commonly affects only one in a given region, doubtless illustrating the same host-adaptation as the mistletoe of northern Europe, *Viscum album*, with which it was at first confused.—The type to be understood as of Carolina.

Specimens examined:—UNITED STATES. NEW JERSEY. Without locality (*Mühlenberg*, 639, in Herb. Willdenow as no. 18295,—*Viscum purpureum* Willdenow, not L.; *Cuming*, 1823; *Schweinitz*, 1829; *Korthals*, 1843; *Eby*, 1894). [Monmouth or Ocean Co.?] (*Knieskern*). Atsion (*Tatnall*). Middletown (*Torrey*). PENNSYLVANIA. Cumberland Mts. (*Rafinesque*, 1823,—*V. serotinum*). Martio (*Eby*, 1888). DELAWARE. Eastern short (*Canby*, 1880). Without locality (*Nuttall*; *Beyrich*; *Read*). Newcastle Co. (*Canby*, 1862). MARYLAND. Montgomery Co. (*Darlington*). Baltimore (*Harper*, 1888). Eastern shore (*Stevens*, 1885). DISTRICT OF COLUMBIA. Washington (*Ward*, 1876). VIRGINIA. Without locality (*Buckley*; *Stocking*; *Vasey*, 1875). Bedford Co. (*Curtiss*, 1872). Virginia Beach (*Britton*, 1892). Norfolk Co. (*Heller*, 750). Hanover Co. (*Henry*, 1890). Dismal Swamp (*Kearney*, 2356). Near Washington (*Hedgcock*, 8269). WEST VIRGINIA. Without data (*McCarthy*). Huntington (*Killingsworth*, 1915). NORTH CAROLINA. Without locality (*Baldwin*, 307,—Pursh herb.; *Buysman*, 1883; *McCarthy*, 1879). Hot Springs (*Ransdell*). Swain Co. (*Beardslee & Kofoed*, 1891). Biltmore (*Biltmore Herb.*, 4339a). Chapel Hill (*Coker*, 1911). Great Lake (*Brown*, 114). SOUTH CAROLINA. Without locality (*Bosc*; *Curtis*, 1852). Charleston (*Clark*, 1857). Abbeville (*Diedrick*, 118). Santee Canal (*Ravenel*).

*A list of hosts is given by Hedgcock in *Phytopathology*. vol. 5. p. 178.

Oconee Co. (*Anderson*). GEORGIA. Without locality (*Beyrich*, 1834). Oconee & Gwinnett Cos. (*Small*, 1893). Darien (*Smith*, 2310). Thomson (*Bartlett*, 6). FLORIDA. Without locality (*Martin*). Apalachicola (*Dean*). Jacksonville (*Faxon*, 1873). Beresford (*Hulst*, 1893). Lake City (*Rolfs*, 538; *Bitting*, 1079). Brooksville (*Long*, 15169). ALABAMA. Without locality (*Bigelow*). Gainesville (*Soulard*, 1872). Auburn (*Earle & Baker*, 1897; *Graham*, 1911). Talladega Springs (*Pollard & Morgan*, 247a). MISSISSIPPI. Natchez (*Shimek*, 1898). LOUISIANA. Without locality (*Tainturier*; *Trudeau*). New Orleans (*Drummond*, 140, 1832). Baton Rouge (*Dodson*, 1896; *Edmunds*; *Edgerton*). ARKANSAS. Without locality (*Rafinesque*,—*V. serotinum*). Fort Smith (*Bigelow*, 77, 1853). Judsonia (*Meek*, 1889). Independence (*Eggert*, 1896). Black Rock (*Rolfs*, 1891). Little Rock (*Hasse*; *von Schrenk & McCrory*, 1912). Ft. Cobb to Ft. Arbuckle (*Palmer*, 254, 1868). Earle (*Pittmann*, 1902). Batesville (*Smith*, 183,—the 5-jointed staminate spikes nearly 40 mm. long). OKLAHOMA. Verdigris (*Bush*, 526). Tulsa (*Davidson*, 1898). Muskogee (*Brainerd*, 1911). MISSOURI. Dunklin Co. (*Bush*, 1892). Ashville (*Eggert*, 1892). Poplar Bluff (*Eggert*, 450; *Eby*, 1893; *Savage & Stull*, 1174). TENNESSEE. Without locality (*Chadbourne*). Memphis (*Fendler*). Decatur Co. (*Ames*, 1858). Knox Co. (*Ruth*, 176, 177, 1426). Nashville (*Lapham*, 1874; *Palmer*, 1897). KENTUCKY. Without locality (*Rafinesque*,—*V. serotinum*; *Steetz*). Lexington (*Short*). Corydon (*Powell*). Shelbyville (*Herb. Jones.*, 2459). Bowling Green (*Price*). ILLINOIS. "Champaign Co." (*Perriam*,—doubtless an error of locality). Pulaski Co. (*Brendel*, 1860). Metropolis (*Gleason*, 1902). Mt. Carmel (*Trelease*). Villa Ridge (*Raymond*, 1869). INDIANA. Without locality (*Prince Wied Neuwied*, 1838). New Harmony (*Engelmann*, 706, 1835). Evansville (*Marker*, 1901). OHIO. Without locality (*Frank*, 1835, 1837). Banks of the Ohio (*Engelmann*, 1840). Near North Bend (*Short*, 1852). Lawrence Co. (*Werner*, 1892). Cleveland (*Krebs*, 101).

Rafinesque, in the mistletoes of the region east of the Mississippi river, saw five species:—(1) *Viscum ochroleucum*, with subsessile obovate 3-nerved leaves, spikes nearly equaling them, and yellowish white berries,—from New Jersey to Florida; (2) *V. rugosum*, with petiolate obovate or broadly elliptical 3-nerved leaves, very short spikes, and white berries turning red when dry,—from Delaware and Virginia. These two seem to represent the range of forms in the northern Atlantic States, and, dating from 1836, their specific names, under *Viscum*, are later than *flavescens* of Pursh (1814) under the same genus. The flowering of *ochroleucum* is said to be vernal; (3) *V. serotinum* (Pl. 25), with subpetiolate obovate hardly nerved leaves longer than the spikes, and snowy white berries turning purplish when dry,—from Kentucky, Illinois and Missouri. This is said to flower in the autumn and early winter, and

the description agrees well with the plants of the middle west, which, like Rafinesque's specimens, are hardly distinguishable from those of the east; the name (1836) can not displace the earlier *flavescens*; (4) *V. leucarpum*, with sessile oblong probably nerveless leaves, glomerate spikes with the flowers in twos or threes, and white berries,—from western Louisiana and probably Texas. In the more elongated leaves this description agrees sufficiently well with the plant now known from Louisiana, though scarcely separable from the narrower-leaved eastern form except in its fewer and more distant fruits. Dating from 1817, this name also is more recent than *flavescens*. The last of the Rafinesque species, (5) *V. oblongifolium*, with petiolate oblong or narrowly elliptical somewhat 3-nerved leaves, very short spikes, and solitary oblong "red" [?] berries, from Florida, can scarcely be compared with anything known to me except the close ally of *flavescens* collected by Mr. Eaton in the Everglades,—from which region Rafinesque is not known to have seen material. Like most of the preceding, this name dates from 1836, so that it cannot be made to replace the earlier *flavescens*, though if it could be shown to pertain to Mr. Eaton's plant it would have priority (under *Viscum*) over the name now given to that *Phoradendron*. The only species of Rafinesque of which I have seen specimens is labeled *Viscum serotinum*,—from the Cumberland Mountains of Pennsylvania and an unspecified locality in Arkansas, in the Delessert Herbarium; and from an unspecified locality in Kentucky, at the Academy of Science of Philadelphia.

A curious fact in the history of this species is that Pursh, who unmistakably meant the *Viscum album* of Walter, wrote *flavescens* Willdenow [Swartz], instead of *flavens* Willdenow, with which West Indian species he ambiguously identifies the mistletoe of the southeastern United States which thus obtained its now long-established specific name through accidental copying or deliberate emendation (for it is twice spelled *flavescens*) of a preoccupied name. It may be noted, too, that Eichler wrote *flavum* instead of *flavens* in the key of his masterly analysis of the genus in tropical America.

Though Willdenow had the present species in his herbarium (Pl. 25) as representing the *Viscum purpureum* of Linnaeus, there can be little doubt that Linnaeus himself intended this name to apply to the West Indian mistletoe figured on plate 95 of Catesby's great work, which obviously represents a *Dendropemon*, to which genus the Linnean species is now, and properly, referred.

PHORADENDRON FLAVESCENS ORBICULATUM Engelmänn.

Phoradendron flavescens orbiculatum Engelmänn, Boston Journ. Nat. Hist. vol. 6. p. 212. 1850.

P. orbiculatum Engelm., Mem. Amer. Acad. n. s. vol. 4. p. 59. 1849.

Differs from the type, into which it seems to pass, in its characteristically nearly round leaves, 15-25x20-30 mm.—Plate 26.

Southwestern Atlantic region (? exclusively) on *Quercus*.—The type from Arkansas.

Specimens examined.—UNITED STATES. ARKANSAS. Little Rock (*Engelmann*, 707, 1837,—the type of *P. orbiculatum*; *von Schrenk*, 1912). Arkansas Post (*Kellogg*, 1909). OKLAHOMA. Without locality (From *S. F. Trelease*, 1915). LOUISIANA. Shreveport (*von Schrenk*, 1912). TEXAS. Dallas (*Bush*, 1160). Trinity River (? *Mearns*, 171). Quitman (*Long*, 12048).

PHORADENDRON MACROTOMUM Trelease.

Phoradendron macrotomum Trelease in Small, Shrubs of Fla. p. 121. 1913.

Not forked, the moderate branches without cataphyls, dioecious. Internodes rather long (2-4x30-40 mm.). Leaves prevailing oblongate, very obtuse, 1.5-2x5-7 cm., cuneately petioled for about 10 mm. Spikes mostly solitary, moderate (20-30 mm.), lengthening to 60 or 70 mm. in fruit), somewhat pubescent, with about 5 joints clavately about 6-flowered when pistillate and some 20-flowered when staminate: peduncle 2-6 mm. long: scales somewhat tomentose. Fruit more or less greenish white, rather ellipsoidal, glabrous, 4x5 mm., in distinctly separated whorls: sepals nearly glabrous, closely inflexed.—Plates 5, 27.

South Atlantic region, on *Fraxinus*, *Nyssa*, *Prunus*, *Punica*, *Quercus*, *Xanthoxylum*, etc.—The type from Florida.

Specimens examined:—UNITED STATES. FLORIDA. Jacksonville (*Curtiss*, 4569, 1894,—the type; 2459; *Lighthipe*, 1897; *Long*, 15214). Hillsborough Co. (*Fredholm*, 6474). Hibernia (*Canby*, 1869). Without locality (*Gray*, 1842; *Gilbert*, 1883). Manatee (*Simpson*, 49). Clarcona (*Meislahn*, 155). Orange Springs (*Mell*, 1907). Gainesville (*Schnabel*, 1911; *Long*, 15133, 15242). Red Bay (*Ward*, 1912). Clearwater Harbor (*Pilsbry*, 1904). Palatka (*Smith*, 1872). Lynne (*Long*, 15180, 15180a, 15181). Fort Myers (*Long*, 15155-6).

PHORADENDRON EATONI Trelease.

Phoradendron Eatoni Trelease in Small, Shrubs of Fla. p. 121. 1913.

Not forked, the slender branches without cataphyls, dioecious. Internodes moderately long (1-3x15-30 mm.), glabrescent. Leaves oblanceolate-elliptical, very obtuse, 1-1.5x2.5-4 or 5 cm. Spikes solitary, short (5-10 or 15 mm.), minutely velvety, with 2 or 3 rounded or shortly

oblong joints 6- to 12- or even 30-flowered when staminate: peduncle 1-2 mm. long: scales minutely velvety. Pistillate flowers and fruit?—Plate 28.

South Atlantic region (? exclusively) on *Fraxinus*.—The type from Florida.

Specimens examined: UNITED STATES. FLORIDA. Deep Lake, Lee Co. (*Alvah A. Eaton*, 1310, Mar. 1905, the type). Hancock Creek (*Harshberger*, 1912).

Phoradendron Engelmanni n. nom.

Phoradendron flavescens pubescens Engelm., Boston Journ. Nat. Hist. vol. 6. p. 212. 1850.

P. flavescens Stevens & Hall, Diseases of Econ. Pl. f. 187.

Not forked, the moderate branches without cataphyls, dioecious. Internodes rather short (2.5x20-40 mm.), subcanescently tomentose like the foliage. Leaves obovate to oblanceolate, very obtuse, 1.5-2.5x3-5 cm., cuneately subpetioled for about 5 mm. Spikes mostly solitary, moderate (15-20 mm., lengthening to 30-40 mm. in fruit), canescent, with some 4 or 5 joints rather clavately 6- to 12-flowered when pistillate or oblong and 20- to 30-flowered when staminate: peduncle 2-3 mm. long: scales tomentose. Fruit white, subglobose, glabrous, about 5 mm. in diameter, in rather close whorls: sepals nearly or quite glabrous, closely inflexed.—Plates 5, 29, 30, 31.

East Texan region, on *Celtis*, *Maclura*, *Quercus*, *Ulmus* and, very conspicuously, *Prosopis*.—The type from Texas.

Specimens examined:—UNITED STATES. TEXAS. Vicinity of New Braunfels (*Lindheimer*, 406, 1846—the type; 115, 1120, 227, 1121, 1849; 445, 1122, 1850). Comancheries (*Berlandier*, 678, 2088, 1828). Bexar Co. (*Jermy*, 1904). San Antonio (*Ferriss*). Gillespie Co. (*Jermy*). Nolan Co. (*Broadhead*, 1887). Lampasas Co. (*Joor*). Melissa (*Pammel*, 1888). Dallas Co. (*Reverchon*, 837). Austin (*Heald*, 1909, 1911; *Long*, 15103; *Hedgcock*, 422, 427). Mitchell Co. (*Holstein*). West Texas (*Soulard*, 1882). Davis Mts. (*Tracy & Earle*, 188). Fayette Co. (*Matthes*, 573). MEXICO. CHIHUAHUA. Ciudad Juarez (*Stearns*, 1911).

Phoradendron Engelmanni Claviger n. var.

Differing from the type in its more elongated fruiting spikes (40-50 mm.) with distinctly separated whorls of fruit.—Plates 5, 21.

With the type, into which it probably merges, chiefly on *Prosopis*.—The type from Texas.

*A list and analysis of host plants in Texas is given by Bray, Bull. Bur. Pl. Ind., U. S. Dep. Agr. No. 166. p. 22.

Specimens examined:—UNITED STATES. TEXAS. Millett (*Trelease*, 1897,—the type). Waco (*Heller*, 1376). Bluffdale (*Ward*, Oct. 12, 1891,—on *Quercus*). Bexar Co. (*Jermy*, 1904). Kaufman Co. (*Tyler*, 1904). Big Spring (*Rose, Standley & Russell*, 12211). Without locality (*Menzel*). Austin (*Long*, 12041,—on *Celtis*).

Phoradendron Greggii n. sp.

Phoradendron flavescens tomentosum Engelm. in Watson, Bot. Calif. vol. 2. p. 105. 1880.

Not forked, the rather short and slender branches without cataphyls, dioecious. Internodes rather short (2x20-30 mm.), densely velvety tomentose, like the foliage. Leaves oblanceolate-elliptical or broader, very obtuse, 1-1.5x2.5-3 or even 2x4.5 cm., cuneately subpetioled for 2-4 mm. Spikes often clustered, long (30-60 mm.), tomentose, with 4 or 5 joints somewhat clavately about 8-flowered when pistillate and oblong and 30- or 40-flowered when staminate: peduncle 2-5 mm. long: scales velvety-tomentose. Fruit white, subglobose, glabrous, about 5 mm. in diameter, in rather distinct whorls: sepals more or less puberulent, closely inflexed.—Plate 22.

Chihuahuan region (? exclusively) on *Acacia* and *Prosopis*.—The type from northern Mexico.

Specimens examined:—MEXICO. Rinconada, between Monterrey and Saltillo (*Gregg*, 31, pistillate, 254, staminate, 1847,—the types). Topo Chico, Monterrey (*Herb. Field Mus.*). Jimulco (*Pringle*, 845). Without data (? *Pringle*, 1883). Peña, Coahuila (*Purpus*, 1106).

Phoradendron thyrsoides n. sp.

Not forked, the moderate branches without cataphyls, dioecious. Internodes rather short (2-3x10-20 mm.), rather persistently stellate-velvety like the foliage. Leaves oblanceolate-spatulate, very obtuse, about 1x3-5 cm., cuneately subpetioled for about 5 mm. Spikes mostly solitary, short (scarcely 10 mm., lengthening to 20 mm. in fruit), tomentose, with 3 or 4 nearly globose joints about 8-flowered when pistillate, clavately lengthening in the somewhat thyrsoidally clustered fruiting spikes: peduncle about 3 mm. long: scales staring-puberulous. Fruit white, subglobose, glabrous, about 4 mm. in diameter, in rather close whorls: sepals glabrescent, closely inflexed.—Plate 23.

Eastern Sierra Madre region.—The type from eastern Mexico.

Specimens examined:—MEXICO. Victoria (*Palmer*, 103, 1907,—the type). Gomez Farias (*Palmer*, 291). San Luis Potosi (*Parry & Palmer*, 7291½).

Phoradendron colipense n. sp.

Not forked, the rather long branches without cataphyls, dioecious. Internodes moderate (2-3x20-40 mm.), like the foliage from coarsely hispid with short yellow hairs becoming nearly glabrous. Leaves obliquely oblanceolate-elliptical, very obtuse, 1.5-2.5x5-8 cm., cuneately subpetioled for about 8 mm. Spikes mostly clustered, moderate (35 mm.), yellow-hispid, with 5 or 6 oblong joints about 30-flowered when staminate: peduncle 2 mm. long: scales somewhat tomentose. Pistillate flowers and fruit?—Plate 23.

Eastern Sierra Madre region.—The type from eastern Mexico.

Specimens examined:—MEXICO. Colipa (*Liebmann*, 8,—the type,—*P. flavescens pubescens* Oliver, Vidensk. Meddel. Naturalist. Foren. Kjöbenhavn. 1864. p. 176.

PHORADENDRON MACROPHYLLUM Cockerell.

Phoradendron macrophyllum Cockerell, Amer. Nat. vol. 34. p. 293. 1900.
P. flavescens macrophyllum Engelm. in Rothrock, Bot. Wheeler. p. 252. 1878. (=Rothrock, Repts. upon the bot. collections, as vol. 6, Rept. U. S. Geogr. Surv. . . in charge of G. M. Wheeler).

Not forked, the rather long and stout branches without cataphyls, dioecious. Internodes rather short (3-5x20-30 mm.), from sparingly villous becoming nearly glabrous, like the foliage. Leaves broadly elliptical-obovate or nearly round, very obtuse, large, 2-4.5x2.5-6 cm., rather abruptly wing-petioled for about 5 mm. Spikes often clustered, moderate (15-30 mm., sometimes lengthening to 50 mm. in fruit), glabrate, with some 4 subglobose joints about 6-flowered when pistillate, or 3-6 oblong joints 18- to 36-flowered when staminate: peduncle 2-5 mm. long: scales somewhat villous. Fruit white, globose, essentially glabrous, 4-5 mm. in diameter, in rather close whorls: sepals glabrate, little parted.—Plates 5, 7, 9, 10, 34.

Sonoran region, on *Alnus*, *Celtis*, *Fraxinus*, *Juglans*, *Platanus*, *Populus* and *Salix*.*—The type from Arizona.

Specimens examined:—UNITED STATES. ARIZONA. Gila River (*Gilbert*, 104, 1873; Camp Grant (*Rothrock*, 362, 1874):—the types of *P. flavescens macrophyllum*,—both on *Fraxinus*. Bill Williams Fork (*Bigelow*, 3, 1854). Without locality (? *Fremont*, 106, 1844; *Palmer*, 1876). South of Flagstaff (*Drake*, 15116-7, 15120). Beaver Creek (*Drake*, 15121). Santa Rita Mts. (*Engelmann*, 1880; *Griffiths*, 2678; *Shear*, 4200, 4206). Santa Catalina Mts. (*Toumey*, 2). Chiricahua Mts. (*Blumer*, 1520, 1523, 1533, 1946). Tucson (*Toumey*, 33, 1894; *Shear*,

*A list of hosts—probably inclusive of the next species—is given by Hedgecock in *Phytopathology*. vol. 5. p. 178.

4259; *Ferriss*; *Lloyd*, 1907). Huachuca Mts. (*Wilcox*, 1892; *Ferriss*). Fort Verde (*Mearns*, 164). Tonto Basin (*Toumey*, 289). Sta. Cruz River (*Pringle*, 1884). Willow Springs Mts. (*Griffiths*, 3644). Dudleyville (*Griffiths*, 3676). Rincon Mts. (*Griffiths*, 1797). Beaver Creek (*MacDougal*, 612). Dagoon Summit (*Eby*). Oracle (*Hedgcock* & *Long*, 9692). Sedona (*Hedgcock*, 4924).

An almost glabrous form, f. *glabrata*, occurs with the type in southern Arizona:—Dudleyville (*Griffiths*, 3674); Arabaca (*Griffiths*, 6144); Chiricahua Mts. (*Blumer*, 1517, 1534, 1535; *Burrall*, 1126); on the Boundary, south of Bisbee (*Mearns*, 891); and from S. Pedro to Fronteras, Sonora, Mexico (*Hartman*, 946).

***Phoradendron macrophyllum circulare* n. var.**

Leaves round, small, 1.5-2 cm. in diameter; otherwise resembling the type, with which it occurs.—Plate 35.

Specimens examined:—UNITED STATES. ARIZONA. Sta. Rita Mts. (*Griffiths* & *Thorner*, 191,—the type).

***Phoradendron macrophyllum Jonesii* n. var.**

Leaves oblanceolate-obovate, small, scarcely 1.5-2x3-4 cm., resembling those of *P. Engelmanni*; the young growth yellowish- or gray-tomentose. In the region of the type.—Plate 35.

Specimens examined:—UNITED STATES. ARIZONA. Bowie (*Jones*, 4279,—the type; 4281,—in leaf-shape approaching var. *circulare*).

***Phoradendron Cockerellii* n. sp.**

Not forked, the rather long and stout branches without cataphyls, dioecious. Internodes rather short (2-4x20-40 mm.), quickly glabrate like the foliage. Leaves broadly elliptical to oblanceolate, very obtuse, 1.5-2x3.5-5.5 cm., cuneately subpetioled for 5-10 mm. Spikes mostly solitary, moderate (15-30, or lengthening to 40 or 50 mm.), glabrous, with about 4 joints clavately about 6-flowered toward the top when pistillate and ellipsoidal and 20- to 30-flowered when staminate: peduncle 4-5 mm. long: scales and receptacular cups ciliate. Fruit white, globose, glabrous, about 4 mm. in diameter, in distinct whorls: sepals glabrous, closely inflexed.—Plates 5, 36.

Southern Rocky Mountain region, characteristically on *Populus* and *Salix*, but also on *Fraxinus*.—The type from New Mexico. It was this New Mexican form which Professor Cockerell actually had before him when applying to the preceding species the binominal *P. macrophyllum* as a substitute for *P. flavescens macrophyllum* Engelm.

Specimens examined:—UNITED STATES. NEW MEXICO. Mesilla Park (*Standley*, 525, 1906; *Wooton*, 1902, 1906; *Hedgcock*, 9953). Santa Fe to the Rio Grande (*Wislizenus*, 41, 1846-7). Without locality (*Wright*, 15, 1851; 1785, 1851-2). Silver City (*Metcalf*, 31—the type). Caruthers Ranch (*Hedgcock & Long*, 9861). Mangas Springs (*Metcalf*, 26,—more persistently villous than usual). Mimbres River (*Vreeland*, 808). Las Cruces (*Simpson*; *Lay*, 1903). Rincon (*Blumer*, 1905). Turkey Creek Cañon (? *Hedgcock*, 841). TEXAS. El Paso (*Havard*, 1881; *Jones*, 1884). Eldon (*Havard*, Nov. 1881). MEXICO. CHIHUAHUA. Ciudad Juarez. (*Stearns*, 1911).

***Phoradendron coloradense* n. sp.**

Not forked, the rather long and slender branches without cataphyls, dioecious. Internodes rather short (2x30-40 mm.), from velvety becoming glabrous like the foliage. Leaves oblanceolate-obovate, very obtuse, 1.5-2x3-6 cm., cuneately slender-petioled for about 10 mm. Spikes mostly solitary, rather long (30-50 mm.), essentially glabrous, with about 3 joints clavate and some 6-flowered when pistillate or oblong and 20- to 30-flowered when staminate: peduncle 5-10 mm. long: scales ciliate. Fruit white, subglobose, glabrous, about 5 mm. in diameter, in rather distinct whorls: sepals glabrous, usually closely inflexed.—Plate 37.

Sonoran region (? exclusively) on *Prosopis*.—The type from California.

Specimens examined:—UNITED STATES. CALIFORNIA. Fort Yuma (*du Barry*, Feb. 4, 1865,—the type; *Thomas*). Colorado River (*Schott*). The Needles (*Jones*, May 1884). A plant from Cameron's ranch, Laguna, Cal., with leaves ranging from nearly round to obovate, 3-4x5-6 cm. (*Schoenfeldt*, 3687), doubtless also belongs here.

***Phoradendron longispicum* n. sp.**

Not forked, the rather long but slender branches without cataphyls, dioecious. Internodes rather long (2-3x40-50 mm.), subcanescently velvety-tomentose, like the foliage, or the latter glabrate and rather glossy. Leaves elliptical-obovate to oblanceolate, very obtuse, 2-3.5x4-6 or even 7 cm., cuneately rather stout-petioled for about 10 mm. Spikes sometimes clustered, moderate (15-30 mm., lengthening to 40 mm. in fruit), short-villous, with 3-5 joints clavately about 12-flowered when pistillate and oblong and about 20-flowered when staminate: peduncle 3-6 or 10 mm. long: scales short-villous and ciliate. Fruit white, subglobose, glabrous, about 4 mm. in diameter, in rather distinct whorls: sepals short-villous at base, nearly meeting.—Plates 38, 39.

Central Californian region, on *Aesculus*, *Alnus*, *Fraxinus*, *Juglans*, *Platanus*, *Populus*, *Robinia* and *Salix*: apparently rarely on *Quercus*.*—The type from California.

Specimens examined:—UNITED STATES. CALIFORNIA. Lake Co. (*Bolander*, 2670). Sacramento River (*Wilkes Expedition*, 1316,—the type, as also of *P. flavescens quinquenervium* Torr. in herb.). Kaweah (*Hopping*, 263). Visalia (*Rattan*, 1912). Araquipa Rancho (*Jepson*, 1894). Vacaville (*Jepson*, 1894; *Platt*, 1894). Putah Creek (*Steiger*, 1894). Kern Co. (*Grinnell*, 399, 402). Ventura Co. (*Abrams & McGregor*, 33, 49). Mendocino (*Brown*, 921). Chico (*Griffiths*, 1912). San Gabriel (*Brewer*, 113). San Bernardino (*S. B. & W. F. Parish*, 680). Lytle Creek Cañon (*Abrams*, 2749; *Spaulding*, 299-301; *Graves*, 1697). Santa Monica Range (*Hasse*, 4626, 1889, 1893). Pasadena (*Jones*, 3028, etc.). San Bernardino Co. (*J. F. James*, 1879). Los Angeles Co. (*Braunton*, 792). San Diego Co. (*Alderson*, 705; *Stokes*, 1895). Temecula (*Leiberg*, 3215). Claremont (*Chandler*, 1897). Without locality (*Wright*, 1853-6; *Vasey*, 1875, 1880). Mohave Desert (*Saunders*, 1906). ARIZONA. Sedona (*Hedgcock*, 4923).

***Phoradendron longispicum cyclophyllum* n. var.**

Differs from the type, with which it occurs, in its smaller characteristically orbicular leaves.

Specimens examined:—UNITED STATES. CALIFORNIA. Soland Co. (*Jepson*, 1894,—the type).

PHORADENDRON VILLOSUM Nuttall.

Phoradendron villosum Nuttall, Journ. Acad. Nat. Sci. Philadelphia. n. s. vol. 1. p. 185. 1848.—Cannon, Bull. Torr. Bot. Cl. vol. 28. p. 374. pl. 27-28.

P. flavescens villosum Engelm. in Rothrock, Bot. Wheeler. p. 252. (=Rothrock, Repts. upon the bot. collections, as vol. 6, Rept. U. S. Geogr. Surv. . . . in charge of G. M. Wheeler) 1878,—as to the West-Coast plant.

Viscum villosum Nuttall in Torrey & Gray, Fl. vol. 1. p. 654. 1840.

Not forked, the rather short stout branches without cataphyls, dioecious. Internodes short (2.4x20-25 mm.), densely short-villous like the foliage. Leaves oblanceolate-obovate, very obtuse, 1.5-2 or rarely 3 x3-4 or even 5 cm., cuneately subpetioled for 3-5 mm. Spikes often clustered, short (10-15 mm., scarcely exceeding 20 mm. in fruit), short-villous, with about 3 short swollen joints, some 6-flowered when pistillate and

*See Hedgcock, Phytopathology. vol. 5. p. 178, for hosts—possibly inclusive of the following species.

12-flowered when staminate: peduncle 2-3 mm. long: scales villous-tomentose. Fruit white, from elongated becoming subglobose, somewhat short-villous at top, about 4 mm. in diameter, in close whorls: sepals rather villous, somewhat parted.—Plates 1, 5, 6, 7, 10, 40.

Californian region, usually on *Quercus* but also on *Acacia*, *Aesculus*, *Arctostaphylos*, *Persica*, *Populus*, *Rhus*, *Robinia*, *Salix* and *Umbellularia*.*—The type from Oregon.

Specimens examined:—UNITED STATES. OREGON. Wahlamet Woods (*Nuttall*, 1834,—the type). Without locality (*Hall*, 456; *Finley*, 1900). Roseburg (*Engelmann*). Waldo (*Howell*, 1884). Grant's Pass (*Howell*, 1264). Gold Hill (*Walpole*, 152). Ashland (*Walpole*, 380). Central Point (*Ashworth*, 147). CALIFORNIA. San Francisco Bay (*Wilkes Expedition*, 1667, 1853-4). Oakland (*Hillebrand*, 1863). Lake Co. (*Bolander*, 2671). Upper Sacramento (*Wilkes Expedition*, 1772). Napa Valley (*Bigelow*, 1854). Ukiah (*Blasdale*, 1019). Salinas Valley (*Brewer*, 564; *Vasey*, 1880). Palo Alto (*Baker*, 203). Fort Tejon (*Horn*, 1863). Placerville (*Bolander*; *Rattan*). Scott River (*Hedgcock*, 1893). Sicon Valley (*Lemmon*, 1875). Siskyou Co. (*Pond*, 189, 192; *Hedgcock*, 1896; *Butler*, 565). Plumas Co. (*Austin*). Butte Co. (*Austin*, 698; *Drew*, 1889). Raymond (*Hedgcock*, 4840). Chico (*Bidwell*, 1890). Little Chico (*Bruce*, 1786). Sierras (*Bessey*, 1875.) Sugar Pine (*Scherfee*, 1914). Mendocino Co. (*Brown*, 953; *Chesnut*, 595; *Clarke*, 1-5). Asti (*Pammel & Davis*, 114). Vacaville (*Jepson*, 1894). Sonoma Co. (*Heller & Brown*, 5036). Northfork (*Jack*, 1907). Amador Co. (*Braunton*, 1258; *Hansen*, 720). Emigrant Gap (*Jones*, 1882). Byron Gulch (*Ward*, 116). Shasta Co. (*Baker & Nutting*, 1894). Calaveras Grove (*Hutchens*, 1900). Mt. Hamilton (*Chandler*, 6043; *Blankinship*, 1891). Kaweah River Basin (*Hopping*, 264). Mariposa Co. (*Hollick*, 1880). Hood's Peak (*Michener & Bioletti*, 1893). El Portal (*Hottes*, 1914). San Luis Obispo Co. (*Barber*, 1901). Sta. Barbara (*Elmer*, 3794). Sta. Clara Co. (*Davy*, 551; *Elmer*, 1758). Auberry (*Jordan*, 8296—on *Arctostaphylos*, 8332—on *Rhus*). San Bernardino Co. (*Parish*, 1073; *Abrams*, 2687, 2749). Los Angeles Co. (*Grant & Wheeler*, 979=6243). Wilson's and Baldy Trail (*McClatchie*, 1893). Riverside (*Grant*, 4517, 4533). San Jacinto Mts. (*Hall*, 2531; *Gregory*, 1890; *Berg*, 1904). Sta. Rosa Mountain (*Smith*, 5466). San Diego Co. (*Mearns*, 3767; *Palmer*, 440; *Chandler*, 5456; *Stokes*, 1895). Laguna (*Mearns*, 3617). Without locality (*Fitch*, 1849; *Kuntze*, 1874). MEXICO. LOWER CALIFORNIA. Encenada (*Jones*, 3734). Mountains (*Orcutt*, 1310a). Nachoguero Valley (*Schoenfeldt*, 3400).

*Cf. Cannon, Bull. Torr. Bot. Cl. vol. 28. p. 374.—Hedgcock, Phytopathology. vol. 5. p. 179.

Phoradendron villosum rotundifolium n. var.

Differs from the type in its small orbicular-obovate leaves, 1-1.2x1.5-2 cm.—Plate 41.

Southern range of the type, chiefly on *Platanus* and *Quercus*.

Specimens examined:—UNITED STATES. CALIFORNIA. Sta. Barbara (*Elmer*, 3794 in part,—the type). Jolon, Monterey Co. (*Eastwood*, 1894). Cajon Pass (*Bigelow*, 7; *Cooper*, June 8, 1861; *Trelease*, 1892).

Phoradendron tomentosum Oliver

Phoradendron tomentosum Oliver, Vidensk. Meddel. Naturahist. Foren. Kjöbenhavn. 1864. p. 176.

Viscum tomentosum de Candolle, Prodrum. vol. 4. p. 670. 1830.

Not forked, the rather short stout branches without cataphyls, dioecious. Internodes rather short (2-3x10-35 mm.), densely velvety-tomentose like the foliage, with at first yellow hairs. Leaves obovate-oblancoolate, very obtuse, 1-2x2-3.5 cm., involutely contracted rather than petioled for about 3 mm. Spikes somewhat clustered, moderate (10 or 15 to 20-35 mm.), velvety-tomentose, with about 3 swollen joints some 8-flowered when pistillate and 12- to 30-flowered when staminate: peduncle 2-3 mm. long: scales tomentose. Fruit white, subglobose, nearly glabrous, scarcely 4 mm. in diameter: sepals short-villous at base, more or less meeting.—Plate 42.

Mexican tableland, on *Celtis*, *Prosopis*, *Quercus*, etc.—The type from central Mexico.

Specimens examined:—MEXICO. "Real de Catone" (*Berlander*, 1364, 1839,—the type of *V. tomentosum* as also of *V. mimosearum* Moricand in herb.). Baños del Grande near Real del Monte (*Ehrenberg*). Cedros (*Lloyd*, 147; *Kirkwood*, 147; *Lloyd & Kirkwood*, 15). Durango (? *Palmer*, 777,—a very yellow-tomentose specimen with some leaves subacute.

Phoradendron puberulum n. sp.

Not forked, the rather long and slender branches without cataphyls, dioecious. Internodes long (2-3x30-60 mm.), minutely rusty-pubescent like the foliage. Leaves oblanceolate, very obtuse, 1.5-2x4-7 cm.), cuneately rather slender-petioled for 5-10 mm. Spikes usually solitary, moderate (30 mm.), pubescent, with about 4 ellipsoidal joints covered by some 12 flowers when pistillate: peduncle 2-3 mm. long: scales and receptacular cups rusty-ciliate. Fruit?: sepals pubescent.—Plate 43.

Western Sierra Madre region of Mexico (? exclusively) on Leguminosae.—The type from western Mexico.

Specimens examined:—MEXICO. Barrancas between Guadalajara and Tepic (*Gregg*, 895, 1849,—the type).

A form with stout internodes scarcely 10 mm. long and smaller scarcely petioled leaves scarcely 1x3 cm., from the Sierra Madre of Chihuahua, may be known as *P. puberulum chihuahuense* (*Endlich*, 1220, 1906,—the type; 1170; 1267; *Jones*, Sept. 14, 1903, at Guayanapa Cañon).—Plate 43.

Phoradendron Coryae n. sp.

Not forked, the rather long and stout branches without cataphyls, dioecious. Internodes moderately long (2.5x25-40 mm.), densely short stellate-tomentose like the foliage. Leaves round-ovate, broadly elliptical or exceptionally obovate, very obtuse, 1.5-3x2.5-3.5 cm., rather abruptly stout-petioled for about 3 mm. Spikes mostly clustered, rather short (15-20 mm.), tomentose, with 3 or 4 swollen joints about 12-flowered when pistillate and 18- to 36-flowered when staminate: peduncle 2-3 mm. long: scales tomentose. Fruit white, round-ovoid, pubescent above, small (3 mm.), in close whorls: sepals pubescent, erect and widely parted.—Plates 5, 10, 44.

Sonoran region (? exclusively) on *Quercus*.—The type from Arizona.

Specimens examined:—UNITED STATES. ARIZONA. White Cliff Creek (*Bigelow*, 8, 1854). Pass of Mt. Hope (*Bigelow*, 9, 1854). Fort Whipple and Prescott (*Coues & Palmer*, 323; *Toumey*, 1894; *Cohoon*, 7; *Miss Kate T. Cory*, 1911; *Hedgcock*, 4853, 15100). South of Flagstaff (*Drake*, 15115). Camp Apache (*Girard*; *Rothrock*, 262; *Gilbert*, 1874; *Hedgcock & Long*, 9686, 9688). Mesa south of Black River (*Rothrock*, 794). Santa Rita Mts. (*Engelmann*; *Pringle*, 1881; *Thorner*, 100; *Toumey*, 1894). Rincon Mts. (*Blumer*, 3601). Pima Cañon (*Griffiths*, 2616). Oracle (*Jones*, 1903; *Hedgcock & Long*, 9677-8). San Carlos Reservation (*Coville*, 1915). Copper Basin (*Toumey*, 288). Crown King (*Hedgcock*, 4872-3). Strawberry Valley (*Toumey*, 290). Bowie (*Jones*, 4253). Cosnino (*Jones*, 4041). Garcia Forest (*Hedgcock*, 843). Tonto Basin (*Coville*, 1074). Sta. Catalina Mts. (*Griffiths*, 3454; *Selkirk*, 1771-2). Huachuca Mts. (*Wheeler*; *Wilcox*, 1893, 391, 458; *Mearns*, 2479). Beaver Creek (*Drake*, 15115). Without locality (*Wheeler*, 1872). Chiricahua Mts. (*Blumer*, 1514, 1516—the type, 1521, 1976; *Pilsbry*, 1906; *Burrall*, 1125). Sedona (*Hedgcock*, 4916, 4921-2, 4940). Nogales (*Hedgcock*, 842). NEW MEXICO. Dog Mts. (*Mearns*, 2395, 2427). Burro Mountains (*Rusby*, 389). Organ Mountains (*Wootton*, 127; 1903; *Standley*, 1906). Doña Ana Mts. (*Wootton & Standley*, 1906). Filmore Cañon (*Wootton*, 1899). Black Range (*Metcalfe*, 925). Santa Rita (*Mulford*, 670). Hillsboro to Lake Valley (*Diehl*, 570). Gila River (*Vreeland*, 807). Gila Forest (*Hedgcock*, 9860; *Munro*, 15109, 15110). Fort Bayard

(*Hedrick*, 181). Silver City (*Hedgcock & Long*, 9855). Grant Co. (*Blumer*, 129, 197). Magdalena Mts. (*Herrick & Herrick*, 133). Pinos Altos (*Hedgcock*, 815-7; *Hedgcock & Long*, 9830-2). Without locality (*Wright*, 1786, 1851-2). MEXICO. SONORA. Nogales (*Mearns*, 2643). San Jose Mts. (*Mearns*, 1633, 1760). San Luis Mts. (*Mearns*, 391, 2528). LOWER CALIFORNIA. Rancho Viejo (? *Brandeggee*, 1889).

Specimens referred here that are prevailing narrower-leaved than usual though otherwise not closely alike,—*f. stenophylla*, occur from Arizona (Pajarito Mts., *Trelease*, 362; Chiricahua Mts., *Pilsbry*, 1906; *Blumer*, 1531), and New Mexico (Silver City, *Greene*, 1880). To this perhaps, is referable a specimen from the Sierra de la Laguna, Lower California (*Brandeggee*, Mar. 24, 1892), not readily placeable elsewhere.

Phoradendron Havardianum n. sp.

Not forked, the rather short but stout branches without cataphyls, dioecious. Internodes short (2-3x20 mm.), rather persistently minutely stellate-tomentose like the foliage. Leaves obovate-orbicular or elliptical, very obtuse, small, scarcely 1x1.5-2 cm., rather abruptly subpetioled for about 2 mm. Spikes solitary, short (scarcely 10 mm.), puberulous, with 2 or 3 joints about 20-flowered when staminate: peduncle 2 mm. long: scales puberulous. Fruit white, subglobose, glabrous, 3 mm. in diameter: sepals pubescent at least at base, suberect.—Plate 45.

Chihuahuan region (? exclusively) on *Quercus*,*—The type from Texas.

Specimens examined:—UNITED STATES. TEXAS. Guadalupe Mts. (*Havard*, 82, Oct. 1881,—the type). Cornudos Mts. (*Havard*, 84). Hueco Tanks (? *Mulford*, 141). “Western Texas to El Paso, New Mexico” (? *Wright*, 632, 1849). “California” (*Bigelow*, 1853-4).

Phoradendron Wilkinsoni n. sp.

Not forked, the rather short and slender branches without cataphyls, dioecious. Internodes short (2x10 mm.), minutely stellate-tomentose like the foliage. Leaves obovate-orbicular or broadly elliptical, very obtuse, small, 1-1.5x1.5-2 cm. Spikes solitary, rather short (15-20 mm.), somewhat short-villous, with 3 or 4 ellipsoidal joints 14- to 20-flowered when staminate: peduncle 2 mm. long: scales villous. Fruit?: sepals glabrous.—Plate 45.

Chihuahuan region.—The type from Chihuahua.

Specimens examined:—MEXICO. Sta. Eulalia Mts. (*Wilkinson*, Apr. 3. 1885,—the type).

*For a list of hosts see *Hedgcock*, *Phytopathology*. vol. 5. p. 178.

4. BRACHYSTACHYAE.

Leaves usually relatively narrow, never greatly elongated or large. Shoots neither angled nor as a rule compressed. Mexico.

Persistently woolly.

P. lanatum.

Pubescence usually sparing and evanescent.

Fruit villous or hispid.

Leaves elongated. Chiefly East Mexican.

Fruit retrorsely hispid: sepals meeting.

P. Galeottii.

Fruit sparsely villous.

Sepals not meeting. East Mexican.

P. Palmeri.

Sepals meeting. Lower Californian.

P. peninsulare.

Leaves broad. Lower Californian.

P. Eduardi.

Fruit glabrous or short-hairy.

Leaves sessile, subacute.

P. mazatlanum.

Leaves mostly petioled, very obtuse.

Ample species, of the mainland.

Evanescently hispid, varnished. *P. brachystachyum*.

Densely short-villous: leaves petioled. *P. tlacolulense*.

Sparingly villous: leaves sessile.

P. globuliferum.

Rather small species, of Lower California.

Leaves round-obovate, subpetioled.

P. aureum.

Leaves oblong-obovate, sessile.

P. brachyphyllum.

Leaves spatulate-oblanccolate.

Attenuate base short.

Spikes rather long (20-30 mm.). *P. tumidum*.

Spikes short (15 mm.).

P. Diquetii.

Subpetiolate contraction marked.

Spikes slender, tomentose.

P. peninsulare.

Spikes stout, glabrate.

P. saccatum.

***Phoradendron lanatum* n. sp.**

Not forked but more or less pseudodichotomous from the falling of one lateral branch at a node, the rather long and slender branches without cataphyls, dioecious?. Internodes rather short (3x20-30 mm.), densely and persistently woolly with long sulphur-yellow hairs like the foliage. Leaves narrowly elliptical varying into subspatulate or obovate, subacute to very obtuse, 5-8x2-3 cm., contracted for about 1 mm. at base. Spikes (young) solitary, short (10 mm.), very tomentose, with 2-4 short few-flowered joints: peduncle scarcely 1 mm. long: scales concealed by long hairs. Fruit subglobose, 4 mm. in diameter, slightly villous at top: sepals nearly glabrous, closely inflexed.—Plate 46.

Cordilleran region.—The type from central Mexico.

Specimens examined:—MEXICO. Mesa de Cascomate, Oaxaca (*Purpus*, 2724, 1907). Hacienda Ciervo y Cadereyta, Queretaro (*Rose, Painter & Rose*, 9707,—the type).

Phoradendron Galeottii n. sp.

Not forked, the rather short and slender branches without cataphyls, dioecious?. Internodes rather short (2-3x15-50 mm.), at first much compressed, resinous-dotted, evanescently stellate-tomentose like the foliage. Leaves oblanceolate-oblong, mostly obtuse, .5-1x2-5 cm., gradually narrowed for about 5 mm. at base. Spikes mostly solitary, short (scarcely 15 mm. in fruit), short-tomentose, with about 3 subglobose joints some 12- to 18-flowered when pistillate: peduncle scarcely 2 mm. long: scales finely tomentose. Fruit in congested whorls, round-ovoid, about 4 mm. long, retrorsely yellow-hispid: sepals finely tomentose, closely inflexed.—Plate 46.

Eastern Sierra Madre region (? exclusively) on *Quercus*.—The type from eastern Mexico.

Specimens examined:—MEXICO. Mirador, V. C. (*Galeotti*, 2694, 1840,—the type; *Linden*, 541; *Ross*, 723). Zacuapam (*Purpus*, 6401).

PHORADENDRON PALMERI Greenman.

Phoradendron Palmeri Greenman, Proc. Amer. Acad. vol. 40. p. 28. 1904.

Not forked, the rather short branches without cataphyls, dioecious?. Internodes rather short (2-5x20-30 mm.), somewhat tomentose and rather persistently short-villous like the foliage. Leaves oblanceolate to elliptical-oblong, obtuse, .5-8x2-3.5 cm., cuneate for about 2 mm. but scarcely petioled. Spikes slender, solitary, short (5 mm., lengthening to 10-20 mm. in fruit), loosely villous, with about 3 subglobose joints about 8-flowered when pistillate: peduncle 1-5 or 6 mm. long: scales villous. Fruit ovoid, 4 mm. long, sparsely villous: sepals glabrescent, more or less parted.—Plate 47.

Mexican table land.—The type from eastern Mexico.

Specimens examined:—MEXICO. Alvarez, S.L.P. (*Palmer*, 119, 1902,—the type).

Phoradendron Eduardi n. sp.

Not forked, the rather short stout branches without cataphyls, dioecious?. Internodes rather short (3-4x20-30 mm.), like the foliage loosely villous or glabrate but not tomentose. Leaves elliptical-obovate or oblanceolate, very obtuse, .5-1x1.5-2 cm., cuneately sessile. Spikes stout, moderate (25-35 or 40 mm. in fruit), loosely villous, with 2 or 3-6 elongated clavate joints some 8-flowered when pistillate: peduncle 2-3 mm. long: scales somewhat velvety or villous. Fruit creamy white, subglobose, 4 mm. in diameter, villous: sepals glabrescent, erect, not meeting around the thick stigma.—Plate 47.

Sonoran region of Mexico.—The type from Carmen Island.

Specimens examined:—MEXICO. LOWER CALIFORNIA. Carmen Island (*Palmer*, 882, Nov. 1890,—the type). Todos Santos (*Brandegge*, 512, San Jose del Cabo (*Brandegge*, 512).

***Phoradendron mazatlanum* n. sp.**

Not forked, the rather long and stout branches without cataphyls, dioecious?. Internodes rather long (2-3x50-60 mm.), rather evanescently and sparsely short-villous or puberulent like the foliage. Leaves subspatulately oblong, sometimes falcate, subacute, .5-8x3.5-4.5 cm., gradually narrowed to the broad sessile base. Spikes mostly solitary, moderate (20 mm.), somewhat puberulent, with about 4 joints some 10-flowered about the middle when pistillate. Fruit?: sepals nearly glabrous.—Plate 48.

Sonoran region of Mexico (? exclusively) on Leguminosae.—The type from Sinaloa.

Specimens examined:—MEXICO. Mazatlan, Sinaloa (*Gregg*, 1202, 1849,—the type).

PHORADENDRON BRACHYSTACHYUM Nuttall.

Phoradendron brachystachyum Nuttall, Jour. Acad. Philadelphia. n. s. vol. 1. p. 185. 1847.

Viscum brachystachyum de Candolle, Prodromus. vol. 4. p. 280. 1830.

Not forked, the rather long and slender branches without cataphyls, dioecious. Internodes from short (2x20 mm.) to long (3x60 mm.), somewhat varnished, evanescently hispid like the foliage. Leaves extremely variable even on the same shoot, from typically oblong-lanceolate or oblanceolate to obovate or orbicular, the narrower forms more or less falcate, obtuse, .5x3.5, 1.5-2x5, or 1.5x1.5 cm., cuneately narrowed rather than petioled for 3-5 mm. Spikes mostly solitary, short (10 mm., scarcely reaching 15 mm. in fruit), sparingly puberulent, with 2 or 3 somewhat swollen joints 8- to 12-flowered when pistillate and 18- to 30-flowered when staminate: peduncle 1-3 mm. long: scales nearly glabrous. Fruit globose, umbonate, 3 mm. in diameter, glabrous: sepals essentially glabrous, closely inflexed.—Plates 48, 49.

Mexican tableland, on *Arbutus*, *Quercus*, etc.—The type from about Real del Monte.

Specimens examined:—MEXICO. Tampico to Real del Monte (*Berlandier*,—the type of *Viscum brachystachyum*). Regla (*Ehrenberg*, 422 in part). El Sabino, Zimapan (*Galeotti*, 2692). Aculeingo (*Liebmann*, 7, 11, 3083,—*P. flavescens?* and *P. brachystachyum* var., Oliver), Orizaba (*Mueller*, 221, 1755). Sta. Fe, Valley of Mexico (*Bourgeau*, 572). Tehuacan (*Pringle*, 6759, 7027; *Endlich*, 1899; *Rose*, *Painter & Rose*,

8973; *Rose & Rose*, 11260). Tlacuiltopec (*Purpus*, 4087). Cholula (*Arsène*, 896, 1907; 7, 1908). Tepoxuchil (*Arsène*, 10, 1908). Jordana, Toluca (? *Gregg*, 725, 1849). Chapala, Jalisco (*Diguet*, 109). Fuente, Sinaloa (*Rose, Standley & Russell*, 13520). Aguascalientes, Colima (*Kerber*, 88). Guaymas, Sonora (*Rose, Standley & Russell*, 12574). Ixmiquilpan, Hid. (*Purpus*, 1441; *Rose, Painter & Rose*, 9160). Above Cuernavaca (*Pringle*, 8009, 11160). Cerro S. Felipe, Oaxaca (*Conzatti*, 2198; *Conzatti & Gonzales*, 72). Mitla to Matatlan (*Conzatti & Vazquez*, 1476). Without locality (*Graham*, 231; *Pavon; Aschenborn*, 428). Tzintzuntzan (*Seler*, 1249). Sierra de Parras (*Purpus*, 5073).

PHORADENDRON TLACOLULENSE Loesener.

Phoradendron tlacolulense Loesener, Bull. Herb. Boissier. vol. 2. p. 536. pl. 20. 1894.

Phoradendron tlacolulense Urban, Bot. Jahrb. vol. 23. Beiblatt 57. p. 3. 1897.

Not forked, the short but slender branches without cataphyls, dioecious. Internodes short (1-3x20-30 mm.), densely villous with short yellow hairs like the foliage. Leaves orbicular to very broadly ovate or obovate, very obtuse, .5-1.7x1-2 cm., abruptly contracted to sometimes connate petioles 2-3 mm. long. Spikes mostly solitary, very short (5 mm.), somewhat villous, with 2 or 3 swollen joints about 6-flowered: peduncle scarcely 1 mm. long. Fruit round-ovoid, about 4x5 mm., glabrous: sepals inflexed.—Plate 50.

Cordilleran region.—The type from Oaxaca.

Specimens examined:—MEXICO. Mitla, Oax. (*Seler*, 119,—the type). Near Agua Escondida (*Seler*, 1763).

Phoradendron globuliferum n. sp.

Not forked, the rather short branches without cataphyls, dioecious?. Internodes short (2-3x10-20 mm.), more or less flattened, somewhat short-villous like the foliage. Leaves shortly elliptical-obovate, very obtuse, .5-1x2 cm., sessile. Spikes solitary, short (5 mm., lengthening to 20 mm. in fruit), sparingly short-villous, with about 2 subglobose joints about 8- to 16-flowered when pistillate: peduncle scarcely 2 mm. long: scales sparingly villous. Fruit (immature) subglobose, smooth, small: sepals somewhat villous at base, suberect.—Plate 51.

Sonoran region of Mexico.—The type from Sonora.

Specimens examined:—MEXICO. Guaymas, Sonora (*Palmer*, 88, 1887,—the type; *Brandegge*, 1892).

Phoradendron aureum n. sp.

Not forked, the rather short branches without cataphyls, dioecious. Internodes short (2x10-20 mm.), sparsely short-villous like the foliage. Leaves spatulate-obovate, very obtuse, .6-1x1-2 cm., cuneately subpetioled for about 3 mm. Spikes solitary, golden, short (10-15 mm.), somewhat velvety, with 2 or 3 rounded joints 12- to 24-flowered when staminate: peduncle 2 mm. long: scales conspicuously ciliate. Fruit?—Plate 52.

Sonoran region of Mexico.—The type from Lower California.

Specimens examined:—MEXICO. Sta. Cruz, Lower California (*Rose*, 16848, Apr. 16, 1911,—the type).

Phoradendron brachyphyllum n. sp.

Not forked, the short stout branches without cataphyls, dioecious?. Internodes rather short (2-4x10-30 mm.), sparsely short-villous like the foliage. Leaves (represented only near the ends of the branches, and perhaps much larger when fully developed) obovate-oblong, obtuse, scarcely .3x1 cm., sessile. Spikes mostly solitary, short (scarcely 10 mm.), sparingly short-villous, with about 2 ellipsoidal joints about 6-flowered when pistillate: peduncle 2 mm. long: scales rather conspicuously ciliate. Fruit?: sepals sparingly hispid at least near the base.—Plate 53.

Sonoran region of Mexico.—The type from Margarita Island.

Specimens examined:—MEXICO. Margarita Island, Lower California (*Rose*, 16293, Mar. 16, 1911,—the type).

Phoradendron tumidum n. sp.

Not forked, the moderate branches without cataphyls, dioecious. Internodes rather long (3-4x40-50 mm.), rather sparsely short-villous like the foliage. Leaves oblanceolate, very obtuse, .7x2.5-3 cm., cuneately subsessile. Spikes solitary, long for the group (15-25 or 30 mm.), sparingly short-villous, with about 3 ellipsoidal joints some 30- to 60-flowered when staminate, the lowest joint sometimes swollen to 5 mm. in diameter: peduncle 2 mm. long: scales conspicuously ciliate. Fruit?: sepals somewhat hispid or villous.—Plate 53.

Sonoran region of Mexico.—The type from Lower California.

Specimens examined:—MEXICO. LOWER CALIFORNIA. Espiritu Santo (*Rose*, 16862, Apr. 18, 1911,—the type). La Paz (*Brandegge*, 1892).

PHORADENDRON DIGUETII Van Tieghem.

Phoradendron Diguettii Van Tieghem, Bull. Mus. Hist. Nat. Paris. vol. 1. p. 31. 1895.

Not forked, the moderate branches without cataphyls, dioecious. Internodes moderate (2x20-30 mm.), from sparingly velvety becoming gla-

brous like the foliage. Leaves oblong-spatulate, obtuse, .5x3 cm., cuneately attenuate for about 5 mm. Spikes solitary, short (15 mm.), very sparingly short-tomentose, with about 3 subclavate-oblong joints some 24-flowered when staminate: peduncle 3 mm. long. Fruit?—Plate 54.

Sonoran region of Mexico.—The type from Lower California.

Specimens examined:—MEXICO. LOWER CALIFORNIA. Without further indication (*Diguet*, Dec. 15, 1894, on *Quercus*, in the herbarium of the Museum at Paris,—taken as the type). Magdalena Bay (*Brandege*, 1889, on *Veatchia*).

Phoradendron peninsulare n. sp.

Not forked, the moderate branches without cataphyls, dioecious?. Internodes moderate (2x25-40 mm.), from gray-hispid becoming nearly glabrous like the foliage. Leaves spatulate, mostly very obtuse, .5-1x1.5-3 cm., cuneately attenuate for 5-10 mm. Spikes solitary, rather short (10-15 or 20 mm.), somewhat short-tomentose, with about 3 short clavate joints about 6-flowered above when pistillate: peduncle 2-3 mm. long. Fruit subglobose, sparingly white-villous, 3-4 mm. in diameter: sepals meeting.—Plate 55.

Sonoran region of Mexico. Perhaps the pistillate form of the preceding.—The type from Lower California.

Specimens examined:—MEXICO. LOWER CALIFORNIA. Cape San Lucas (*Rose*, 16354, May 23, 1911,—the type). Carmen Island (*Rose*, 16617, Apr. 2, 1911). San Gregorio (*Brandege*, 1889—from which the fruit is here described).

Phoradendron saccatum n. sp.

Not forked, the moderate branches without cataphyls, dioecious. Internodes rather short (2-4x20-35 mm.), like the foliage somewhat sparsely and transiently short-villous. Leaves narrowly spatulate, obtuse, about .5x1.5-2 cm., contracted into a slender spreading or recurved petiole for 10 mm. Spikes often clustered, golden, rather short (15-20 or 25 mm.), glabrate and glossy, with 3 or 4 oblong joints covered by 24-36 flowers when staminate: peduncle 3 mm. long: scales forming a truncated sac. Fruit?—Plate 55.

Sonoran region of Mexico (? exclusively) on *Jatropha*.—The type from Lower California.

Specimens examined:—MEXICO. LOWER CALIFORNIA. San Josef (*Rose*, 16562, Mar. 21, 1911,—the type). Sta. Margarita Island (*Brandege*, 1889).

5. FERRUGINEAE.

Leaves broad, large for the group, very obtuse, thick. Shoots neither acutely angled nor much compressed. Mexican Cordillera and Western Sierra Madre.

Heavy-leaved: densely rusty-villous.

P. Robinsonii.

PHORADENDRON ROBINSONII (Urban).

Phoradendron Robinsonii Urban, Bot. Jarhb. vol. 23. Beiblatt 5. p. 4. 1897.

Not forked, the long stout branches without cataphyls, dioecious. Internodes rather long (3.5x40-50 mm.), at first very densely rusty-villous like the foliage. Leaves broadly elliptical to oblanceolate or obovate, very obtuse, 1.5-4x5-7 cm., cuneately stout-petioled for 10-15 mm. Spikes often clustered, sometimes produced side by side in successive years, moderate (20-35 mm., lengthening to 50 or even 85 mm. in fruit), villous, with 5-7 rounded joints about 20-flowered when pistillate or oblong and many-flowered when staminate: peduncle 3 mm. long: scales villous and long-ciliate. Fruit subglobose, retrorsely long-villous or hispid, 4 mm. in diameter, in approximated globose clusters 10 mm. in diameter: sepals pubescent, incurved.—Plates 56, 57.

Cordillera and Western Sierra Madre of Mexico (? exclusively) on *Celtis*.—The type from Tehuacan.

Specimens examined:—MEXICO. Without locality (*Karwiniski*; *Hahn*, 1865-6,—*P. Hahnii* Eichler in herb.). Tehuacan (*Pringle*, 6272, 1895,—the type, 9467, 13765; *Rose & Hay*, 5939; *Rose*, *Painter & Rose*, 9877; *Rose & Rose*, 11259; *Endlich*, 1895; *Purpus*, 5832; *Conzatti*, 2199). Tonila (*Kerber*, 87). Acapulco (*Liebmann*, 9, 3102, 1841,—*P. tomentosum* Oliver, Vidensk. Meddel. Naturh. Foren. Kjöbenhavn. 1864. p. 176; *Hinds*, 1841,—slenderer and with thinner leaves, f. *Hindsii*.—Plate 57).

6. VELUTINAE.

Leaves large for the group, characteristically elongated, somewhat acuminate attenuate, rather thin and conspicuously nerved. Shoots neither angled nor much compressed. Cordilleran region of Mexico and Guatemala.

Thin-leaved: yellow-villous.

P. velutinum.

PHORADENDRON VELUTINUM Nuttall.

Phoradendron velutinum Nuttall, Journ. Acad. Philadelphia. n. s. vol. 1. p. 185. 1847.

Viscum velutinum de Candolle, Prodromus. vol. 4. p. 281. 1830.

Not forked, the rather long moderately stout branches without cataphyls, dioecious. Internodes moderate (3-4x20-50 mm.), yellow-villous like the foliage. Leaves falcately lanceolate, acute or rather acuminate, 1-2.5x7-10 cm., conspicuously nerved and veiny, cuneately narrowed to a petiole 5-10 mm. long. Spikes mostly clustered, short (15-20 mm.), villous, with about 3 subglobose joints scarcely 20-flowered when pistillate, or 4 more clavate joints about 30-flowered when staminate: peduncle 3 mm. long: scales villous and long-ciliate. Fruit subglobose, glabrous, about 4 mm. in diameter, in compact whorls: sepals glabrate, more or less parted.—Plate 58.

Mexican tableland and through the Cordillera into Central America, on *Cornus*, *Crataegus*, etc.—The type from Toluca.

Specimens examined:—MEXICO. Real del Monte (*Coulter*, 21). Regla (*Ehrenberg*, 422). Queretaro (*Herb. Berolin.*). Toluca (*Berlandier*, 1158,—the type of *V. velutinum*; *Andrieux*, 347; *Haller*, 410). Valley of Mexico (*Schmitz*, 150; *Schaffner*, 188). Eslava (*Pringle*, 8058, 9509, 13190). Deserta Vieja (*Bourgeau*, 782). San Nicolas and Maromas (*Bourgeau*, 1004, 1116). Contreras (*Endlich*, 634). Salazar (*Endlich*, 1048). Cañada Grande (*Ross*, 148). San Angel (*Uhde*, 1026). Zimapan (*Aschenborn*). Istaccihuatl (*Purpus*, 1777). Sta. Ana, Puebla (*Arsène*, 8). Chinantla (*Liebmann*). Without locality (*Paul*, *Duke of Würtemberg*, 1831; *Schaffner*, 459; *Uhde*, 1027). GUATEMALA. Sacatepequez. Antigua (*Kellerman*, 4541).

An unusually polymorphic species, the type possessing very narrow and long leaves.

7. LONGIFOLIAE.

Leaves large for the group, usually greatly elongated, scarcely attenuate, rather thick, but sometimes conspicuously nerved. Shoots scarcely angled but distinctly compressed at the nodes. Mountains of Mexico and Guatemala.

Leaves scarcely nerved.

Broad for the group (10-25 mm.).

Narrow (5 mm.).

Leaves distinctly about 5-nerved.

P. scaberrimum.

P. longifolium.

P. uspantanum.

Phoradendron scaberrimum n. sp.

Not forked, the long moderately stout branches without cataphyls, dioecious?. Internodes moderate (4x25-60 mm.), scabrous-granular, at first yellow with microscopic tomentum like the foliage, dilated below the nodes to about 10 mm. Leaves narrowly lanceolate, subacute to obtuse or emarginate, 1-2.5x10-16 cm., subpetiolately cuneate for 5-10 mm.,

scarcely nerved. Spikes mostly clustered, rather short (scarcely 25 mm.), yellow-tomentulose, with about 3 rounded joints some 15-flowered when pistillate: peduncle scarcely 3 mm. long: scales gray-tomentulose, scarcely ciliate. Fruit (immature) ovoid, 3 mm. in diameter, yellow-tomentulose: sepals closely inflexed.—Plate 59.

Western Sierra Madre region.—The type from Tepic.

Specimens examined:—MEXICO. Sta. Teresa, Tepic (*Rose*, 3409, Aug. 8, 1897,—the type). Colomas, Sinaloa (*Rose*, 1712).

***Phoradendron longifolium* Eichler, n. sp.**

Phoradendron longifolium Eichler in v. Martius, Fl. Brasil. vol. 5. part 2. p. 107, 134 m,—name only.

Viscum longifolium Zuccarini MS., *vide* Eichler, and in herb.

Not forked, the long rather slender branches without cataphyls, dioecious?. Internodes elongated (2-4x40-75 mm.), resinous-dotted, microscopically tomentose like the foliage, little dilated. Leaves linear-oblong, rather acute, .5-.7x10-14 cm., cuneately subpetioled for about 10 mm., scarcely nerved. Spikes often clustered, rather short (scarcely 25 mm.), tomentose, with 3 or 4 oblong joints about 30-flowered: peduncle 2 mm. long: scales tomentose and long-ciliate. Fruit?—Plate 60.

Cordilleran region of Mexico.—The type from Oaxaca.

Specimens examined:—MEXICO. San Pedro Nolasco, Oaxaca (*Karwinski*, 1833,—the type: occurring in the Munich herbarium, von Martius' herbarium at Brussels, the Vienna herbarium, and the Delessert herbarium at Geneva).

***Phoradendron uspantanum* n. sp.**

Not forked, the rather long and stout branches without cataphyls, dioecious. Internodes rather long (4x70 mm.), evanescently sparsely hispid like the foliage, more or less ancipital, dilated at the nodes to nearly 10 mm. Leaves narrowly oblong-lanceolate, obtuse, about 1x15 cm., cuneately subpetioled for 10 or 15 mm., prominently 5-nerved and somewhat veiny. Spikes more or less clustered, moderate (25-40 mm.), nearly glabrous, with 3-5 narrowly oblong joints about 50-flowered when staminate: peduncle 2-4 mm. long: scales glabrate, ciliate. Fruit?—Plate 61.

Guatemalan region.—The type from Guatemala.

Specimens examined:—GUATEMALA. San Miguel Uspantan, Quiche (*Heyde & Lux*, 3141, Apr. 1892,—the type).

C. CALYCVLATAE.

Spikes rather long, 3- to 5-jointed, each joint with numerous flowers in about 12 series. Berries globose, granular-papillate, moderately small (4 mm.), white?. The young growth is rather sparingly long-villous. Mexico.

Stems broadly winged and nerved.

ALATAE.

8. ALATAE.

Stems decussately much flattened, with nerved wings. Leaves falcately lanceolate. Mountains of central Mexico.

Stems and leaves strongly nerved.

P. calyculatum.

Phoradendron calyculatum n. nom.

Viscum falcatum Hooker, Icon. Plant. vol. 4. pl. 368. 1841.

Phoradendron falcatum Eichler in von Martius, Fl. Brasil. vol. 5. pt. 2. p. 107. 1868.

Not forked, the very long, much compressed branches without cataphyls, dioecious. Internodes rather long (60-100 mm. or more), at first, like the foliage, sparingly hairy and somewhat resinous-dotted, 2-edged, from 5 mm. at base dilated to 20 mm. above. Leaves falcate, narrowly lanceolate, obtuse, 1x15-25 cm., gradually narrowed into thick petioles about 10 mm. long, about 5-nerved and veiny. Spikes mostly solitary, moderate, (30-40 mm.), usually somewhat villous, with 3-5 oblong joints some 50-flowered: peduncle 2-3 mm. long: scales typically somewhat villous, long-ciliate like the often deeply lobed calyx-like receptacular cups. Fruit globose, 4 mm. in diameter, minutely granular-papillate: sepals short, glabrate, parted.—Plates 62, 63.

Sierras and Cordillera of Mexico (? exclusively) on *Quercus*.—The type from eastern Mexico.

Specimens examined:—MEXICO. Jalapa (*Linden*, 538, 1839: *Galeotti*, 2696, 1840,—the type of *V. falcatum* Hooker). Oaxaca (*Andrieux*, 346). Sierra de S. Felipe (*Pringle*, 4699). Tlapancingo (*Nelson*, 2074). Without locality (*Karwinski*). Cuernavaca, Morelos (*Pringle*, 13189).

Strongly marked in its chief characteristics, but presenting several distinguishable forms: *filipes* (Pl. 64), with the slender staminate spikes borne on a filiform peduncle 10-12 mm. long (Zacupam, V. C., *Purpus*, 6279, 1912, with the type); *occidentale*, with longer spikes as much as 60 mm. long, of about 6 joints (Sierra de Nayarit, Jalisco (*Diguet*, 111, forming hanging tufts 2 mm. or more long); *Gonzalezi* (Pl. 64), with shorter broader sometimes obovate leaves 1-2x3.5-5 or even 9 cm. (Cañada de S. Gabriel, Etla (*Conzatti & Gonzales*, 295).

II AEQUATORIALES.

With cataphyls or scales constantly present toward the base of the branches, exceptionally cymosely dichotomous or forking without a percurrent main stem. Spikes axillary and, in the cymose forms, terminal. Flowers in dioecious or monoecious unisexual spikes or, mostly, with staminate and pistillate flowers on the same spike. All are glabrous except for the small group Anomalae. Central in Brazil, extending from the Argentine to central Mexico and through the West Indies even to the northern Bahamas.

Cataphyls on the basal joint only of each branch.

INTERRUPTAE.

Cataphyls on alternate joints.

PARADOXAE.

Cataphyls on all joints.

CONTINUAEE.

D. INTERRUPTAE.

Cataphyls strictly limited to the basal joint of each branch, the branches normally percurrent so that some joints occur without cataphyls. Throughout the range of the Aequatoriales.

With foliage leaves.

FOLIOSAE.

Leaves reduced to scales.

SQUAMOSAE.

I. FOLIOSAE.

With foliage leaves. All are glabrous except for the group Anomalae. Throughout the range of the Aequatoriales.

Leaves basinerved.

BASINERVIAE.

Leaves pinnately veined, never very narrow.

PENNINERVIAE.

a. BASINERVIAE.

Nerves starting from the base of the leaves, rarely joined for a short distance above the petiole, never with a pinnately branched midrib although the middle nerve may be stronger and more raised than the others.

Glabrous throughout, though sometimes papillate.

Leaves not clasping.

Fruit elongated, with erect sepals.

LONGIBACCAE.

Fruit round, ovoid, or ellipsoidal.

Flowers prevailingly 2-ranked on each joint.

Fruit tuberculate.

Stem mostly sharply 4-angled.

Leaves obovate. Of wide range. EMARGINATAE.

Leaves elliptical or lance-oblong.

Argentine.

ARGENTINAE.

- Stem not 4-angled. Mexican or Central American. VERNICOSAE.
 Fruit not tuberculate though sometimes wrinkled or minutely papillate.
 Leaves equally or obscurely nerved on both sides. Mexican or Central American. VERNICOSAE.
 West Indian.
 Leaves lanceolate or elliptical. CHRYSOCARPAE.
 Leaves obovate-spatulate. DOMINGENSES.
 Of the Pacific Islands. *P. Townsendi*.
 Leaves fine-nerved above, heavy-nerved beneath. *P. laxiflorum*.
 Flowers prevailingly 4-ranked on each joint.
 Commonly varying into 2 ranks.—See above.
 Often varying into 4+2 series, *i. e.* with an extra flower interposed at top between the two rows of flowers over each scale of the spike. a.
- a Fruit tuberculate.
 Stem sharply 4-angled.
 Leaves obovate. Brazilian. *P. emarginatum*.
 Leaves narrowly lanceolate. West Indian. *P. gracile*.
 Leaves subelliptical. Argentine. *P. argentinum*.
 Stem not sharply 4-angled.
 Argentine. Leaves short. ARGENTINAE.
 Uruguayan. Leaves elongated. FALCIFERAE.
 Mexican or Central American. ANNULATAE.
- a Fruit not tuberculate.
 Stem sharply 4-angled.
 Sepals closely meeting in fruit. QUADRANGULARES.
 Sepals not meeting: stem rhombic. RUBRAE.
 Stem terete or 2-edged, at first somewhat rhombically compressed or 4-lined.
 Leaves drying golden, with thin revolute margin.
 Brazilian. NITENTES.
 Leaves not golden-glossy.
 Drying thin, sharp nerved.
 Mexican. NERVOSAE.
 Central American. *P. Cooperi*.
 South American.
 Leaves narrow. ANGUSTIFOLIAE.
 Leaves broad. ANDINAE.
 West Indian. CHRYSOCARPAE.
 Coriaceous or heavy.
 Rather sharp-nerved.
 Dimidiate, South American. DIMIDIATAE.

- Obovate or oblanceolate to linear.
 - Stem terete. Brazilian. ENSIFOLIAE.
 - Stem compressed or 2-edged.
 - Brazilian. Leaves moderately large. TURBINISPICAE.
 - Argentine. LIGAE.
 - Mexican.
 - Fruit ovoid. LANCEOLATAE.
 - Fruit globose. PRINGLEAE.
- Opaque, or obscurely or heavily nerved.
 - Fleshy. Mexican. NERVOSAE.
 - Moderately coriaceous.
 - South American.
 - Spikes very long with large scales. POLYGYNAE.
 - Spikes not long.
 - Venezuelan. RIGIDAE.
 - Brazilian. CORIACEAE.
 - West Indian.
 - Fruit smooth.
 - Sepals closely meeting. CHRYSOCARPAE.
 - Sepals parted. RUBRAE.
 - Fruit wrinkled. CAMPBELLIAE.
 - Central American.
 - Leaves elongated. CORYNARTHRAE.
 - Leaves broad or small. BREVIFOLIAE.
 - Mexican.
 - Leaves small or broad. BREVIFOLIAE.
 - Leaves long and narrow. PRINGLEAE.
 - Very thick and dull. ROBUSTISSIMAE.
- Flowers prevailingly 6-ranked on each joint.
 - Varying into 2 or 4 ranks.—See the preceding sections.
 - Varying into 4+2 series.
 - Leaves obscurely nerved.
 - Thick and opaque, mostly papillately dull. ROBUSTISSIMAE.
 - Moderately coriaceous, smooth.
 - Spikes moderately long, with moderate scales.
 - Venezuelan. RIGIDAE.
 - Brazilian.
 - Leaves moderate. CORIACEAE.
 - Leaves rather large.
 - P. lanceolato-ellipticum*.

Spikes long, with large scales.

POLYGYNAE.

Leaves heavy-nerved, fleshy.

Lanceolate. Mexican.

NERVOSAE.

Dimidiate. Andean.

OBLIQUAE.

Leaves sharply nerved.

Stem 4-angled or winged.

AMPLECTENTES.

Stem flattened or ancipital.

Leaves elliptical-dimidiate.

DIMIDIATAE.

Leaves lance-ovate, thin.

ANDINAE.

Stem terete.

ENSIFOLIAE.

Leaves clasping except in two species, thin and sharply nerved: stem 2- or 4-winged and acutely angled: flowers in 6 series, exceptionally fewer or more.

AMPLECTENTES.

Tomentose throughout. South American.

ANOMALAE.

9. ANNULATAE.

Leaves elongated or narrow, rather thick though nerved from the base. Shoots 2-edged for a time. Cataphyls a single pair on the basal joint only. Flowers mostly in 4 series. Fruit warty. Southern Mexico and Central America.

Leaves relatively broad (1.5-2.5 cm).

Petiole contraction slender.

Leaves broadest below the middle.

P. annulatum.

Leaves broadest about the middle.

P. multiflorum.

Leaves cuneately subsessile.

P. amplifolium.

Leaves narrow (.4-.8 cm.).

P. carneum.

PHORADENDRON ANNULATUM Oliver.

Phoradendron annulatum Oliver, Vidensk. Meddel. Naturhist. Foren. Kjöbenhavn. 1864. p. 176.

Phoradendrum annulatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 3. 1897.

Not forked but more or less pseudodichotomous from the falling of one lateral branch at a node, the rather long and stout branches with basal cataphyls only, dioecious?. Internodes moderate (3-4x35-50 mm.), somewhat resinous-dotted like the foliage, 2-edged or at first somewhat quadrate becoming terete. Cataphyls a single pair, basal, somewhat tubular, white-margined. Leaves lanceolate, obtuse to acute, 1.5-2x10-12 cm., cuneately contracted into a slender petiole 1-2x10 mm. Spikes mostly solitary, moderate (30 mm. in fruit), smooth, with about 4 clavate joints 12-18-flowered in 4 or 4+2 series when pistillate: peduncle 3 mm.

long: scales and deep receptacular cups scarcely ciliate. Fruit subglobose, reddish, 4 mm. in diameter, low-verrucose: sepals closely inflexed.—Plate 65.

Guatemalan and Isthmian regions.—The type from Costa Rica.

Specimens examined:—COSTA RICA (*Oersted*, 14, 3082, the type, 4, 3096). GUATEMALA. Volcan Fuego, Sacatepequez (*Smith*, 2610).

***Phoradendron multiflorum* n. sp.**

Not forked, the rather long and slender branches with basal cataphyls only, dioecious. Internodes moderate (2-3x40-50 mm.), somewhat resinous-dotted like the foliage, somewhat 2-edged becoming terete. Cataphyls a single pair, basal, tubular-bifid, white-margined. Leaves falcately lanceolate, mucronately subacute, 1 to mostly 1.5 or 2x12-18 cm., cuneately contracted into a subpetiolar base 2x10-15 mm. Spikes mostly solitary, moderate (about 40 mm.), smooth, with about three oblong joints turbinate about 20-flowered in 4 series when pistillate and some 60-flowered in 6 series when staminate: peduncle 3-4 mm. long: scales and receptacular cups minutely or evanescently ciliate. Fruit (immature) subglobose, reddish, 3-4 mm. in diameter, low-verrucose: sepals closely inflexed.—Plates 66, 67.

Guatemalan region.—The type from Guatemala.

Specimens examined:—GUATEMALA. Volcan Acatenango, Sacatepequez (*Kellerman*, 5154, staminate, and 5155, pistillate, Feb. 20, 1905,—the types).

***Phoradendron amplifolium* n. sp.**

Not forked, the rather long and stout branches with basal cataphyls only, dioecious?. Internodes rather long (2-5x50-80 mm.), resinous-dotted like the foliage, 2-edged becoming terete. Cataphyls a single pair, basal, somewhat tubular and white-margined. Leaves oblanceolate-oblong to obovate-elliptical, very obtuse, 1.5-3x8-9 or even 12 cm., prominently 5-nerved and distinctly veiny, cuneately broad-based for about 10 mm. Spikes clustered, moderate (about 30 mm.), smooth, with about 3 oblong-fusiform joints about 12-flowered in 4-series when pistillate: peduncle 2-4 cm. long: scales little ciliate. Fruit subglobose, reddish, large, 6-7 mm. in diameter, verrucose: sepals closely inflexed.—Plate 68.

Cordilleran and eastern Sierra Madre regions of Mexico.—The type from Puebla.

Specimens examined:—MEXICO. PUEBLA. Piaxtla to Amolac (*Nelson*, 2018, Nov. 24, 1894, the type). Huajuapam to Oaxaca and Retlatzingo (*Nelson*, 1982). Tehuacan (*Liebmann*, 12, 3080). VERA CRUZ. Papantla (? *Liebmann*, 13, 3106). Pont de Jalapa (*de Pedeguarra*, 2690).

PHORADENDRON CARNEUM (Urban).

Phoradendrum carneum Urban, Bot. Jahrb. vol. 23. Beiblatt 5. p. 1. 1897.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, dioecious?. Internodes rather short (2.4x30-60 mm.), resinous-dotted like the foliage, ancipital becoming terete. Cataphyls a single pair, basal, somewhat tubular and white-margined. Leaves linear-lanceolate, obtuse or mucronate to acute, 5-1.2x5-15 cm., rather evidently 3- or occasionally 5-nerved but scarcely veiny, cuneately narrowed for 5 to 10 mm. rather than petioled. Spikes mostly clustered, moderate (20-30 mm.), smooth, with about 3 oblong joints some 8-flowered in 4 series when pistillate: peduncle 2-5 mm. long, bearing a few flowers when elongated: scales and receptacular cups short-ciliate. Fruit globose, reddish-orange, 4-5 mm. in diameter, somewhat verrucose: sepals inflexed and nearly or quite meeting.—Plate 69.

Western Sierra Madre region, extending onto the tableland and through the Mexican Cordillera (? exclusively) on *Ipomoea* trees.—The type from Jalisco.

Specimens examined:—MEXICO. JALISCO. Guadalajara (*Pringle*, 1854, 1888,—the type, 2668, 8647; *Safford*, 1438). Zapotlan (*Ross*, 459). Chapala (*Palmer*, 719). Sayula (*Jones*, 570). Etzatlan (*Barnes & Land*, 284). Without locality (*Diguet*, 107). MICHOACAN. Morelia (*Gregg*, 745, 1849). GUANAJUATO. Guanajuato (*Dugès*, 30, 266a). Empalme de Gonzales (*Rusby*, 177,—“on cotton-wood”). QUERETARO. Cadereyta to Visaron (*Rose, Painter & Rose*, 9742). OAXACA (*Conzatti*, 1913).

10. PRINGLEAE.

Leaves linear-lanceolate, rather thick, somewhat evidently basinerved. Shoots ancipital for a time. Cataphyls a single pair, on the basal joint only. Flowers in 4+2 series. Fruit smooth, with closed sepals. Southern Mexico.

Fruiting spikes short (15-20 mm.).

P. Pringlei.

Fruiting spikes moderate (25-35 mm.).

P. Forestierae.

Phoradendron Pringlei n. sp.

Somewhat pseudodichotomous, the moderately long slender branches with basal cataphyls only, dioecious. Internodes short (2x15-30 mm.), varnished when young like the foliage, ancipital, somewhat dilated upwards, becoming terete. Cataphyls a single pair, 5-10 mm. above the base, scarcely tubular. Leaves linear, submucronately rather acute, .5-.8x7-16 cm., long-attenuate at base. Spikes usually solitary, short (10-15

mm.), smooth, with 2 or 3 joints globose and covered by 12-18 flowers in 4+2 series when pistillate, or clavate and about 30-flowered when staminate: peduncle 1-2 mm. long: scales scarcely ciliate. Fruit globose, waxy, white?, 3 mm. in diameter, smooth, overgrown by the receptacular cups: sepals closely inflexed.—Plate 70.

Mexican tableland (? exclusively) on *Frazinus*.—The type from Hidalgo.

Specimens examined:—MEXICO. HIDALGO. Tula (*Pringle*, 6630, 1897, —the type). Dublan (*Pringle*, 11159, 13188).

PHORADENDRON FORESTIERAE Robinson & Greenman.

Phoradendron Forestierae Robinson & Greenman, Proc. Amer. Acad. vol. 32. p. 36. 1896.

Little forked, the moderately long slender branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x30-50 mm.), more or less varnished when young like the foliage, ancipital becoming terete. Cataphyls a single pair 5-10 mm. above the base, spreading. Leaves linear-lanceolate, obtuse or submucronate, .5-.7x5-8 cm., long-attenuate at base. Spikes mostly solitary, moderate (30-40 mm.), with about 3 joints swollen in the middle and about 14-flowered in 4+2 series when pistillate: peduncle scarcely 2 mm. long: scales and receptacular cups somewhat ciliate. Fruit subglobose, white?, 3 mm. in diameter, smooth, deeply covered by the thin receptacular cups: sepals closely inflexed.—Plate 70.

Cordilleran region of Mexico (? exclusively) on *Forestiera*.—The type from Puebla.

Specimens examined:—MEXICO. PUEBLA. Tehuacan to Esperanza (*Pringle*, 6290, 1895,—the type). Near Tehuacan (*Rose & Hay*, 5873; *Endlich*, 1899a). Tepoxuchil (*Arsène*, 6).

11. NERVOSAE.

Leaves rather broad and fleshy, typically coarsely nerved from the base. Cataphyls on the basal joint only, 1 or less commonly 2 or rarely 3 pairs. Flowers mostly in 4+2 series. Fruit round, nearly or quite smooth, with closed sepals. Mexico.

Leaves ovate: spikes short.

P. pachyarthron.

Leaves lanceolate: spikes rather long.

P. Schumanni.

Shoots nearly terete.

Shoots ancipital.

Cataphyls mostly 2 pairs.

P. Purpusi.

Cataphyls 1 pair.

Spike-joints turbinate-fruited.

P. nervosum.

Spike-joints clavate-fruited.

P. Conzattii.

PHORADENDRON PACHYARTHRON Eichler.

Phoradendron pachyarthron Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 122. 1868.

Phoradendrum pachyarthron Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 33. 1897.

Scarcely forked, dull, the moderate branches with basal cataphyls only, dioecious?. Internodes moderate (3-4x40-60 mm.), somewhat ancipitally compressed, becoming terete. Cataphyls a single pair about 5 mm. from the base or frequently 1 or 2 additional pairs at short intervals, scarcely tubular. Leaves rather elliptical below becoming lanceolate above, obtuse, 2-5.5x5-9 cm., cuneately subpetioled for 15-20 mm. Spikes often clustered, rather short (20 mm.), with about 4 subglobose joints some 6-flowered in 4+2 series when pistillate: peduncle 2 mm. long: scales evanescently ciliolate. Fruit?—Plate 71.

Mexican tableland.—The type from near Real del Monte.

Specimens examined:—MEXICO. Baños (*Ehrenberg*, 1011, Dec. 1838, —the type).

Phoradendron Schumanni n. sp.

Scarcely forked, rather glossy, the moderate branches with basal cataphyls only, dioecious?. Internodes moderate (2-4x20-60 mm.), quickly terete. Cataphyls a single pair 5 or mostly 10-15 mm. above the base, or 2 pairs 10-15 mm. apart, acutely spreading. Leaves oblong-elliptical to elliptical lanceolate, very obtuse, 1.5-2.5x6-8 cm., cuneately subpetioled for about 10 mm. Spikes often clustered, rather long (20 or 25 to 50 or 70 mm.), with some 4 to 6 joints 6- to 12- or 14-flowered in 4 or 4+2 series: peduncle 2-4 mm. long: scales minutely ciliate. Fruit subglobose, smooth, 5 mm. in diameter: sepals closely inflexed.—Plates 71, 72.

Western Sierra Madre region (? exclusively) on *Quercus*.—The type from Jaral.

Specimens examined:—MEXICO. Mountains about Jaral (*Walther Schumann*, 711, Dec. 25, 1885,—the type, Nov. 20, 1886). Sierra Nana-ruchic, Chihuahua (*Endlich*, 1219). Santiago Papasquiario, Durango (*Palmer*, 84). Without locality (*Karwinski*, 1844). Sierra Madre of N. W. Mexico (*Seemann*, 2140).

Phoradendron Purpusi n. sp.

More or less pseudodichotomous, rather granular, the elongated branches with basal cataphyls only, dioecious?. Internodes rather short, (3x30-50 mm.), somewhat compressed and dilated beneath the nodes becoming terete. Cataphyls mostly 2, sometimes 3 pairs, one basal or nearly so and the others at intervals of 5-10 mm., scale-like. Leaves somewhat falcately lanceolate, acute to very obtuse, 2 or 2.5-4x8-15 cm., cuneately

petioled for 10-15 mm. Spikes mostly clustered, rather long (at length 40 or 50 mm.), with about half a dozen moderate joints some 16- to 24-flowered in 4, 4+2 or 6 series: peduncle 2 mm. long: scales evanescently somewhat ciliate. Fruit subglobose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 73.

Eastern Sierra Madre region (? exclusively) on *Quercus*.—The type from eastern Mexico.

Specimens examined:—MEXICO. Zacuapam, V. C. (*Purpus*, Feb. 1912,—the type). Mirador (*Liebmann*, 4, 3097, 1842,—*P. Reichenbachianum* Oliver). Without locality (? *Hahn*, 1865-6).

PHORADENDRON NERVOSUM Oliver.

Phoradendron nervosum Oliver, Vidensk. Meddel. Naturhist. Foren. Kjöbenhavn. 1864. p. 175.

Scarcely forked, the rather long slender branches with basal cataphyls only, dioecious. Internodes moderate (2-3x50-70 or even 150 mm.), ancipital becoming terete. Cataphyls a single pair, basal, scarcely tubular, white-margined. Leaves obliquely lanceolate, attenuately rather obtuse, 1.5 or 2 to 4 or 5x9-12 or even 17 cm., varying into orbicular and 7x8 cm., 5- or 7-nerved and veiny, cuneately petioled for 10 mm. Spikes mostly clustered, rather long (20-30 becoming 40-60 mm.), smooth, with mostly 4 or 6 joints turbinate 12- to 30-flowered in 4 or 4+2 series: peduncle 3-5 mm. long: scales and receptacular cups evanescently short-ciliate. Fruit subglobose, reddish, 3 mm. in diameter, at length finely granular: sepals inflexed.—Plates 8, 74.

Eastern Sierra Madre region, on *Anona*, *Liquidambar*, *Pyrus*, *Quercus*, etc.—The type from eastern Mexico.

Specimens examined:—MEXICO. VERA CRUZ. Papantla (*Liebmann*, 5, 3089). Colipa (*Liebmann*, 5, 3090,—the type). Cordoba (*Bourgeau*, 1473, 1482, 1483; *Kerber*, 34). Orizaba (*Botteri*, 873; *Mueller*, 1219; *Bourgeau*, 2546). Paso Macho (*Wawra*, 865). Fortin (*Kerber*, 351). El Mirador (*Endlich*, 1138; *Ross*, 718). Sta. Ana (*Bourgeau*, 3034). Zacuapam (*Purpus*, 2877, 1912). Jalapa (*Pringle*, 8191). Without locality (*Herb. Grisebach.*). “Mexico und Umgebung” (*Wawra*, 420).

Phoradendron Konzattii n. sp.

Not forked, the long stout branches with basal cataphyls only, dioecious. Internodes moderate (3-6x25-60 mm.) rough-papillate, ancipital and somewhat dilated becoming terete. Cataphyls a single pair, above the base, acute, spreading. Leaves falcately lanceolate, submucronately obtuse to very long-attenuate, 3-4x15-30 cm., 5- to 7-nerved and somewhat

veiny, cuneately petioled for 20-30 mm. Spikes mostly clustered, stout, long (30, becoming 55-60 mm. in fruit), smooth, with about 5 clavate joints 8- to 12-flowered in 4+2 series when pistillate or with double this number of flowers when staminate: peduncle scarcely 5 mm. long: scales little ciliate. Fruit subglobose, smooth, deeply immersed in the receptacular cups: sepals closely inflexed.—Plate 75.

Cordilleran region of Mexico (? exclusively) on *Quercus*.—The type from Oaxaca.

Specimens examined:—MEXICO. OAXACA. Coyula to Cuyamacalco, Cuicatlan (*Conzatti & Gomez*, 2380, June 22, 1909,—the type). Xayacatlan (*Rusby*, Mar. 1910).

A form with thicker less nerved leaves not attenuate at tip, and short acutely compressed internodes, from Tecomatlan to Pueblo Viejo, Oax. (*Conzatti*, 1897), may be distinguished as var. *tecomatlana* (Pl. 75). With two pairs of cataphyls respectively some 10 and 60 mm. above the base and leaves scarcely 12 cm. long, it is var. *nochixtlanensis* (Huauchilla, Nochixtlan, Oaxaca, at 2500 m. (*Conzatti & Gonzales*, 1187, June 1901).—Plate 76.

12. LANCEOLATAE.

Leaves moderately fleshy, narrowly lanceolate, rather obscurely basinnerved. Cataphyls a single pair, on the basal joint only. Flowers in 4+2 series. Fruit ovoid, smooth, with closed sepals. Mexico.

Shoots quickly terete: leaves heavy-nerved.

P. lanceolatum.

Shoots ancipitally compressed: leaves fine-nerved.

P. falcatum.

PHORADENDRON LANCEOLATUM Engelm.

Phoradendron lanceolatum Engelm., Mem. Amer. Acad. n. s. vol. 4. p. 59. 1849.

Not forked, the moderate branches with basal cataphyls only, dioecious. Internodes moderate (2-3x20-40 mm.), smooth, nearly terete. Cataphyls a single pair, about 8 mm. above the base, acute, spreading. Leaves short-lanceolate, obtuse, 1-1.5x6-8 cm., indistinctly nerved, cuneately subpetioled for about 5 mm. Spikes mostly solitary, moderate (30-40 mm.), rather stout, smooth, with about 5 oblong joints 6- to 10-flowered when pistillate and 15- to 20-flowered in 4+2 series when staminate: peduncle 2-4 mm. long: scales ciliate. Fruit ovoid, 3x4 mm., smooth: sepals closely inflexed.—Plate 77.

Eastern Sierra Madre region (? exclusively) on *Quercus*.—The type from northern Mexico.

Specimens examined:—MEXICO. Rinconada, between Monterrey and Saltillo (*Gregg*, 255,—the type; *Thurber*, 865).

Phoradendron falcatum n. comb.

Viscum falcatum Chamisso & Schlechtendal, Linnaea. vol. 5. p. 172. 1830.
V. Schiedeianum de Candolle, Prodomus. vol. 4. p. 671. 1830.

Not forked, the moderately long and stout branches with basal cataphyls only, dioecious?. Internodes rather short (2-4x20-50 mm.), smooth, ancepitally flattened becoming terete. Cataphyls a single pair, nearly basal, rather blunt and white margined. Leaves lanceolate, obtuse, at length 1.5x8-15 cm., rather distinctly but finely nerved, cuneately attenuate for about 10 mm. Spikes mostly solitary, rather short (15-25 mm.), slender, smooth, with about 4 joints some 6-flowered in 4+2 series when pistillate: peduncle 1-3 mm. long, sometimes with more than one joint: scales ciliate. Fruit (immature) ovoid, 2x3 mm., smooth: sepals inflexed.—Plate 78.

Eastern Sierra Madre region (? exclusively) on *Quercus*.—The type from Jalapa.

Specimens examined:—MEXICO. Jalapa (*Schiede*, 403,—the type of *V. falcatum*). San Luis Potosi (*Parry & Palmer*, 799).

13. ANGUSTIFOLIAE.

Leaves narrow or short, rather thin, fine-nerved from the base. Shoots nearly terete. Cataphyls a single pair, on the basal joint only. Flowers in 4+2 series. Andes.

Leaves linear-lanceolate, long: sepals inflexed.

P. angustifolium.

Leaves broadly lanceolate, short: sepals erect.

P. parietarioides.

PHORADENDRON ANGUSTIFOLIUM Eichler.

Phoradendron angustifolium Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 115. 1868.

Loranthus angustifolius Humboldt, Bonpland & Kunth, Nov. Gen. Sp. vol. 3. p. 442. 1818.

Viscum angustifolium de Candolle, Prodomus. vol. 4. p. 281. 1830.

V. stenophyllum Sprengel, Systema. vol. 1. p. 487. 1825.

Not forked, the moderate rather slender branches with basal cataphyls only, dioecious?. Internodes rather short (2-3x25-50 mm.), smooth, nearly terete or evanescently 2-edged. Cataphyls a single pair, 5-10 mm. above the base, spreading. Leaves linear-lanceolate, obtuse, 1x12-13 cm., finely nerved, cuneately petioled for about 10 mm. Spikes more or less clustered, rather short (20 mm.), slender, smooth, with 3-6 oblong joints some 14- to 30-flowered in 4+2 series when pistillate: peduncle 4-6 mm. long: scales narrowly white margined. Fruit globose, 4 mm. in diameter, smooth: sepals inflexed.—Plate 79.

Andean region.—The type from Peru.

Specimens examined:—PERU. Olleras to Mt. Aipate (*Bonpland*, 3508, —the type of *L. angustifolius*). Without locality (? *Pavon*, —with ciliate scales and pistillate spikes 30 mm. long about 12-flowered at the ends of the joints). BOLIVIA. Without locality (*Cuming*, 184).

Phoradendron parietarioides n. sp.

Not forked, the moderate slender branches with basal cataphyls only, androgynous. Internodes short (2-3x20-30 mm.), smooth, slightly compressed toward the nodes becoming terete. Cataphyls a single pair, above the base, acute, spreading. Leaves lanceolate, acute, 1.5-2.5x6-8 cm., thin, finely 5-nerved and veiny, cuneately subpetioled for about 5 mm. Spikes clustered, short (15 mm.), slender, smooth, with some 3 filiform joints scarcely 10-flowered in 4+2 series: peduncle 2-3 mm. long. Fruit ellipsoidal, 3x4 mm., nearly smooth: sepals suberect, not meeting.—Plate 80.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. Without locality (*Sodirol*, 148/20, —the type, 148/25; *Jameson*, in Herb. Hooker.). Cumbaya (*Sodirol*, c, 1871). Quisaya (*Sodirol*, i, 1874).

14. CORYNARTHRAE.

Leaves elongated or narrow, rather thin, fine-nerved from the base. Shoots mostly 2-edged. Cataphyls 1 or less commonly 2 pairs, on the basal joint only. Flowers in 4 or 4+2 series. Fruit roundish, smooth or wrinkled. Central America.

Leaves narrow, not very sharply nerved.

Fruiting spike-joints clavate.

P. corynarthron.

Fruiting spike-joints turbinate.

P. Tonduzii.

Leaves relatively broad (2 cm.) sharply nerved.

P. Cooperi.

PHORADENDRON CORYNARTHRON *Eichler*.

Phoradendron corynarthron Eichler in v. Martius, Fl. Brasil. vol. 15. pt. 2. p. 115. 1868.

Scarcely forked, the moderately long rather slender branches with basal cataphyls only, dioecious?. Internodes rather short (1-2x30-50 mm.), scarcely 2-edged. Cataphyls usually 2 pairs, one nearly basal and the other some 15 mm. above it, scarcely tubular. Leaves narrowly lanceolate, mucronately subacute, 1-1.5x4-6 cm., more or less evidently about 3-nerved, cuneately subpetioled for scarcely 10 mm. Spikes mostly solitary, moderate (becoming 30-40 mm.), slender, smooth, with about 4 joints clavately some 6- to 12-flowered in 4 or 4+2 series: peduncle 5 mm.

long: scales scarcely ciliate. Fruit (immature) globose, much wrinkled, 3 mm. in diameter: sepals closely inflexed.—Plate 81.

Isthmian region.—The type from Panama.

Specimens examined:—PANAMA. Chiriqui (Wagner, Apr. 1858,—the type).

Phoradendron Tonduzii n. sp.

Not forked, the rather long and slender branches with basal cataphyls only, dioecious. Internodes moderate (2-3x30-60 mm.), striate, 2-edged becoming terete. Cataphyls a single pair, nearly basal. Leaves narrowly lanceolate, obtuse, 1-1.5x15 cm., finely 3- or mostly 5-nerved, cuneately long-attenuate at base. Spikes sometimes clustered, moderate (30-40 mm.), slender, smooth, with 3 or 4 joints turbinate; some 20-flowered in 4 series when pistillate and 30-flowered in 4+2 series when staminate: peduncle scarcely 2 mm. long: scales and receptacular cups microscopically and transiently ciliate. Fruit (immature) somewhat ovoid, 3 mm. in diameter, smooth: sepals closely inflexed.—Plate 82.

Isthmian region.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Sta. Rosa du Copey (*Tonduz*, 12179, Apr. 1898,—the type). San Ramon (*Brenes*, 14407). Without locality (*Friedrichsthal*, 1841/xiv; *Herb. Benth.*).

Phoradendron Cooperi n. sp.

Not forked, the long rather stout branches with basal cataphyls only, dioecious. Internodes elongated (4-5x60-80 mm.), ancipital becoming terete. Cataphyls a single pair, basal, rather acute. Leaves falcately lanceolate, obtuse, 1.5-2.5 or 3x15 cm., finely about 5-nerved, cuneately subpetioled for 10 or 15 mm. Spikes often clustered, slender, moderate or long (20-35 or even 65 mm.), smooth, with some 5 joints about 20-flowered when pistillate and as much as 30-flowered in 4+2 series when staminate: peduncle 1-2 mm. long: scales scarcely ciliate. Fruit (immature) subglobose: sepals closely inflexed.—Plate 83.

Isthmian region.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Estrella, Cartago (*J. J. Cooper*, 5931, July 1887,—the type). Monte Candelaria, San José, etc. (*Oersted*, 5, 3091, 3093, 1846-7). San José (*Hoffmann*, 219, 1854).

15. ANDINAE.

Leaves broad or large, rather thin, fine-nerved from the base. Shoots mostly 2-edged. Cataphyls a single pair, on the basal joint only. Flowers mostly in 4+2 series. Fruit round, smooth, with closed sepals. Andes, including part of Venezuela.

Leaves elongated (10-15 cm.).

Relatively narrow (scarcely 2.5 cm.).

Narrowly lanceolate. Venezuela.

Broadly lanceolate. Colombia.

Relatively broad (3-7 cm.).

Lanceolate. Bolivia.

Ovate-lanceolate. Ecuador.

Leaves rather short (6-7 cm.) and broad. Venezuela.

P. tubulosum.

P. Trianae.

P. semiteres.

P. Verleyseii.

P. granaticolum.

PHORADENDRON TUBULOSUM (Urban).

Phoradendron tubulosum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 5. 1897.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x25-60 mm.), smooth, from ancipital becoming terete. Cataphyls basal, a single pair, tubular, scarious-margined. Leaves falcately lanceolate, obtuse, 2-2.5x14 cm., finely about 7-nerved, cuneately subpetioled for some 10 mm. Spikes more or less clustered, moderate (becoming 30-40 mm. in fruit), with 3 or 4 joints turbinate about 18-flowered in 4+2 series: peduncle about 3 mm. long: scales scarcely ciliate, rather acutely divergent. Fruit (immature) subglobose, nearly smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 84.

Venezuelan region.—The type from Venezuela.

Specimens examined.—VENEZUELA. Tovar (*Fendler*, 1106,—the type). Galipan (*Kuntze*, 1579).

PHORADENDRON TRIANAЕ Eichler.

Phoradendron Trianae Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 117. 1868.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (3-4x50-70 mm.), smooth, very acutely ancipital. Cataphyls a single pair, basal, deeply parted, somewhat scarious-margined. Leaves subfalcately lanceolate, obtuse, about 2.5x9 cm., somewhat indistinctly 5- to 7-nerved, cuneately wing-petioled for 10-15 mm. Spikes more or less clustered, moderate (20, lengthening to 30 mm.), with about 3 rather fusiform joints some 36-flowered in 4+2 series: peduncle 2 mm. long: scales somewhat scarious-margined, scarcely ciliate, subtruncate. Fruit red, globose, smooth, 3-4 mm. in diameter: sepals rather closely inflexed.—Plate 84.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA. Andes de Herve, Antioquia, at 1800 m. (*Triana*, 2778,—the type number). “Colombia and Ecuador” *Lehmann*, 6667).

Phoradendron semiteres n. sp.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes rather long (3-6x50-100 mm.), smooth, ancipital or half-round becoming terete. Cataphyls a single pair, tubular-bifid, scarious-margined. Leaves obliquely or subfalcately lanceolate, obtuse, 1.5 or 2x8-9 or 3-4x12 cm., finely 5- to 7-nerved, cuneately subpetioled for 10 or 15 mm. Spikes more or less clustered, moderate (becoming 30 mm. in fruit), with about 3 ellipsoidal joints 10- to 24-flowered in 4+2 series: peduncle 2 mm. long: scales scarious margined, not ciliate. Fruit red, globose, nearly smooth, 3 mm. in diameter: sepals rather closely inflexed.—Plate 85.

Andean region.—The type from Bolivia.

Specimens examined:—BOLIVIA. Sirupaya, near Yanacachi, S. Yungas (*Buchtien*, 1411, Dec. 17, 1906,—the type). Cotana, at 2450 m. (*Buchtien*, 163). PERU. Without locality (*Pavon*).

Phoradendron Verleyseni n. sp.

Scarcely forked, the long branches with basal cataphyls only, dioecious?. Internodes elongated (3-6x100 mm. or more), smooth, for a time somewhat compressed but soon terete. Cataphyls a single pair, basal, tubular-bifid, white-margined. Leaves (on the same plant) from more or less falcately lanceolate, 2x7 cm., passing into almost truncate ovate, 7x12 cm., obtuse or bluntly acuminate, about 7-nerved, sometimes rather abruptly or subcordately contracted to the cuneately winged 10 mm. petiole. Spikes often clustered, moderate (20 lengthening to 50 mm. in fruit), with about 4 oblong joints some 20-flowered in 4+2 series: peduncle scarcely 5 mm. long: scales scarcely ciliate, subtruncate or notched. Fruit red, globose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 86.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. Without locality (*Verleyesen*, 148*, —the type, 148**, 1896; *Sodi*ro, 19c, 28, 29, 30, 32, 148/29, 148/29b). Aguirre (*Sodi*ro, Dec. 1870). Quito (*Jameson*, 608, 1848). Peruchó (*Sodi*ro, x, 1871). Niebly (*Sodi*ro, x, 1873).

With thicker more persistently compressed internodes, rather thicker leaves, and more numerous flowers than in the type, it occurs from Puente de Chimbo (*Sodi*ro, 148/19) in a form which may be called var. *chimboensis*.—Plate 87. With spikes as in the last, but less compressed internodes and small leaves some .5x5-6 cm., it becomes var. *Fraseri*, without locality (*Fraser*, 1860).

Phoradendron granaticolum n. sp.

Not forked, the rather long branches with basal cataphyls only, dioecious?. Internodes rather long (2-6x25-100 mm.), smooth, elliptically ancipital. Cataphyls a single pair, basal, tubular, scarious-margined. Leaves elliptical-lanceolate to somewhat rhombically ovate, very obtuse, 2.5-4.5x6-8 cm., finely 5- to 7-nerved, cuneately petioled for about 10 mm. Spikes (very young) short (15 mm.), with about 4 oblong joints some 20-flowered in about 6 series: peduncle 2 mm. long: scales scarcely ciliate, somewhat brown-margined. Fruit?—Plate 87.

Venezuelan region (? exclusively on *Punica*).—The type from Venezuela.

Specimens examined:—VENEZUELA. Carácas (*Gollmer*, Apr. 28, 1854, —the type).

16. AMPLECTENTES.

Leaves mostly of medium size, drying rather thin and distinctly fine-nerved from the base, usually clasping with recurved but quickly up-curving bases. Shoots 2- or 4-winged. Cataphyls 1 or rarely 2 pairs, on the basal joint only. Flowers mostly in 6 series. Fruit round, nearly smooth, usually with closed sepals. South America; one species in the West Indies.

Upper internodes ancipital or 2-winged.

Leaves not clasping, relatively large (7-10 cm.). *P. Casimiranum.*

Leaves clasping, usually under 7 cm. long.

Internodes winged.

P. dipterum.

Internodes merely 2-edged.

Leaves narrow (1-1.5 cm.), rather long.

P. multifoveolatum.

Leaves broader (1.5 cm.), rather short.

P. hypericifolium.

Upper internodes acutely 4-angled or 4-winged.

Leaves elliptical-lanceolate.

P. tetrapterum.

Leaves lanceolate, rather long.

Petiolately contracted.

Relatively broad (1:4).

Fertile joints turbinate.

P. demerarae.

Fertile joints clavate.

P. tovarense.

Relatively elongated (1:5).

P. Crulsii.

Sessile and broadly clasping.

P. amplexicaule.

Leaves obovate-oblancoate.

P. Glaziovii.

Leaves ovate-lanceolate, large.

P. amplexens.

Leaves ovate, sessile.

P. turbinispicum.

Phoradendron Casimiranum n. sp.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (3-4x50-70 mm.), the upper flattened and somewhat wing-margined. Cataphyls a single basal pair or 2 approximated pairs, somewhat tubular. Leaves subspatulately oblanceolate, very obtuse or somewhat emarginate, 2x8 cm., exceptionally obovate and as much as 5 cm. wide, finely 5- or 7-nerved, revolutely attenuate for nearly 10 mm., scarcely clasping. Spikes solitary, long (at length 80 or 90 mm.), with 6-8 rather slender joints turbinate about 40-flowered in 6 series: peduncle scarcely 2 mm. long, sometimes with a second pair of scales: scales acutely spreading, scarcely ciliate. Fruit (immature) globose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 88.

Brazilian region (? exclusively) on other mistletoes.—The type from Paraguay.

Specimens examined:—PARAGUAY. Peribebui (*Balansa*, 3220,—the type in the herbarium of M. Casimir de Candolle). Paraguari (? *Balansa*, 4721,—younger and with smaller leaves).

PHORADENDRON DIPTERUM Eichler.

Phoradendron dipterum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 109. 1868.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-6x30-75 mm.), the upper broadly 2-winged. Cataphyls a single nearly basal pair or a second pair 5-10 mm. higher. Leaves elliptical to oblanceolate-oblong, submucronately very obtuse, 1-2.5x3-10 cm., rather distinctly 3- to 5-nerved, gradually revolutely narrowed to the somewhat clasping base rather than petioled. Spikes often clustered, long (40, lengthening to 80 mm. or more in fruit), with half a dozen rather slender oblong joints as much as 30-flowered in 6 series: peduncle 5 mm. long: scales evanescently ciliolate. Fruit (immature) brownish, globose, 3 mm. in diameter, very slightly granular: sepals inflexed.—Plate 89.

Brazilian region.—The type from Ceara.

Specimens examined:—BRAZIL. Ceara (*Gardner*, 1672,—the type). Monte Cruzeiro, Bahia (*Rose & Russell*, 20027).

PHORADENDRON MULTIFOVEOLATUM Eichler.

Phoradendron multifoveolatum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 110. pl. 34. 1868.

More or less pseudodichotomous, the long branches with basal cataphyls only, dioecious. Internodes rather short (2x30-60 mm.), the upper

ancepitally flattened. Cataphyls a single pair, basal. Leaves oblanceolate-oblong, mucronately subacute, .5-1 or 1.5x5-6 or rarely 10 cm., somewhat 3-, 5- or 7-nerved, gradually revolutely narrowed to the somewhat clasping base. Spikes solitary, long (40-80 mm.), with half a dozen slender oblong or somewhat fusiform joints 30- to 60-flowered when pistillate and 60- or 80-flowered in 6 series when staminate: peduncle 5 mm. long, sometimes with a very short basal joint: scales deeply parted, scarcely ciliate. Fruit reddish white, globose, smooth, about 3 mm. in diameter: sepals somewhat parted.—Plate 90.

Brazilian region.—The type from Bahia.

Specimens examined:—BRAZIL. Desert regions of Bahia (*v. Martius*,—the type).

***Phoradendron hypericifolium* n. sp.**

Scarcely forked, the moderate branches with basal cataphyls only, dioecious?. Internodes moderate (2x40-60 mm.), the upper rhombically ancepital. Cataphyls a single pair, basal, tubular-bifid. Leaves elliptical-obovate, obtuse, 1.5x4 cm., rather evidently 5-nerved, somewhat revolutely narrowed to the sessile clasping base. Spikes solitary, long (50-60 mm. in fruit), with about 4 fusiform or turbinate joints some 40-flowered in 6 series when pistillate: peduncle 4 mm. long: scales somewhat notched, scarious-margined, scarcely ciliate. Fruit (immature) red, globose, cellular-papillate, about 3 mm. in diameter: sepals closely inflexed.—Plate 91.

Brazilian region.—The type from Paraguay.

Specimens examined.—PARAGUAY. Southern Paraguay (*Kuntze*, 9, Sept. 1892,—the type).

PHORADENDRON TETRAPTERUM (*Krug & Urban*).

Phoradendrum tetrapterum *Krug & Urban*, Bot. Jahrb. vol. 24. p. 35. 1897.

More or less pseudodichotomous, the rather long and spreading branches with basal cataphyls only, androgynous. Internodes rather short (2-4x30-60 mm.), the upper acutely and rather undulately 4-winged. Cataphyls a single pair, nearly basal, somewhat tubular or annular-bifid. Leaves more or less falcately elliptical-oblanceolate or obovate, rather obtuse, 1.5-3.5x6-10 cm., rather evidently about 5-nerved, cuneately narrowed for 5-10 mm. rather than petioled. Spikes mostly clustered, long (40-90 mm.), with about 5 joints turbinate some 18- to 26-flowered in 4+2 series: peduncle 2 mm. long: scales rather acutely spreading, scarcely ciliate. Fruit white, subellipsoid, cellular-papillate, 2x3 mm.: sepals not meeting.—Plate 92.

Antillean and Caribbean regions (? exclusively) on other mistletoes.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Harris*, 6393,—taken as the type, 6545, 6576, 6926: *Britton*, 813). PUERTO RICO (*Bertero*, from Sprengel in the Presl herbarium; *Kuntze*, 426; *Sintenis*, 5409, 6758; *Britton*, *Stevens & Hess*, 2564; *Stevens*, 4818, 4819, 4828, 4887, 5210, 5211). CARIBBEES. MARTINIQUE (*Isert*, 1787).

***Phorandendron demerarae* n. sp.**

More or less pseudodichotomous, the rather long and spreading branches with basal cataphyls only, androgynous. Internodes moderate (2.5x30-60 mm.), the upper either ancipitally flattened or 4-winged. Cataphyls a single pair, nearly basal or 10-15 mm. above the base, somewhat tubular. Leaves more or less rhomboidally lanceolate, very obtuse, 2.3x5-7 cm., finely about 5-nerved, somewhat revolutely tapered for about 10 mm. rather than petioled, slightly clasping. Spikes more or less clustered, long (40-90 mm.), with about 5 somewhat fusiform or turbinate slender joints about 26-flowered in 4 series: peduncle 2 mm. long: scales acutely ascending, scarcely ciliate. Fruit white, subglobose, smooth, 3 mm. in diameter: sepals not meeting.—Plate 91.

Cayenne region (? exclusively) on other mistletoes.—The type from British Guiana.

Specimens examined:—DEMERARA (*Jenman*, 2546, Nov. 1886,—the type: noted by its collector as the most beautiful of the Guiana mistletoes).

PHORADENDRON TOVARENSE (Urban).

Phoradendrum tovarense Urban, Bot. Jahrb. vol. 23, Beibl. 57. p. 8. 1897.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (3.4x40-80 mm.), ancipital, the upper acutely quadrangular or 4-winged. Cataphyls a single pair, nearly basal. Leaves somewhat falcately lanceolate, very obtuse, 2.3x8-10 cm., finely about 7-nerved, gradually narrowed for 15 or 20 mm. to the somewhat clasping base. Spikes mostly clustered, long (50-80, becoming 120 mm.), with half a dozen joints clavately some 30- to 50-flowered about the middle in 6 or even 8 or 10 series: peduncle 2 or 3 to 7 mm. long: scales subtruncate spreading, scarcely ciliate. Fruit globose, smooth, 3-4 mm. in diameter: sepals nearly meeting.—Plate 93.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1761,—the type, 1110, 1111).

PHORADENDRON CRULSII (Urban).

Phoradendrum Crulsii Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 11. 1897.

Not forked, the long branches with basal cataphyls only, dioecious?. Internodes rather short (3-5x50-60 mm.), the upper acutely and undulately 4-winged. Cataphyls?. Leaves somewhat falcately lanceolate, very obtuse, 2.5-3x8-12 cm., more or less evidently 5- or 7-nerved, cuneately subsessile and clasping. Spikes often clustered, rather long (30, becoming 50-70 mm. in fruit), with half a dozen rather slender joints turbinate about 30-flowered in 6 series: peduncle 3 mm. long: scales ciliate. Fruit (immature) red, subglobose, cellular-papillate, 3 mm. in diameter: sepals closely inflexed.—Plate 94.

Brazilian region.—The type from Goyaz.

Specimens examined:—BRAZIL. Goyaz (*Glaziov*, 22021), July 22, 1895,—the type).

PHORADENDRON AMPLEXICAULE Eichler.

Phoradendron amplexicaule Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 110. 1868.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes rather short (3-4x40-50 mm.), the upper acutely and undulately 4-winged. Cataphyls?. Leaves shortly lanceolate, very obtuse, 1-2x8 cm., somewhat evidently 5- or 7-nerved, broadly sessile and clasping. Spikes mostly clustered, moderate (20-30 mm.), with 2 or 3 joints clavately about 18-flowered in 6 series: peduncle 3 mm. long: scales and receptacular cups somewhat ciliate. Fruit (immature) globose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 94.

Brazilian region.—The type from Brazil.

Specimens examined:—BRAZIL. Without locality (*Weddell*, 1858,—the type collection, in the Candolle herbarium).

PHORADENDRON GLAZIOVII (Urban).

Phoradendrum Glaziovii Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 12. 1897.

Not forking, the rather long somewhat cellular-papillate branches with basal cataphyls only, androgynous. Internodes at length long (1 or 2-4x40-100 mm. or more), the upper acutely 2- or mostly 4-angled or winged. Cataphyls a single basal pair, or a second pair about 5 mm. above the base, somewhat acutely spreading: an occasional pair of fertile scales 2-4 mm. long preceding the foliage. Leaves obovate-ob lanceolate or subspatulate, sometimes mucronate, very obtuse or emarginate, 2-4x5-9 cm., somewhat revolutely attenuate for 10- or 15 mm. rather than

petioled, somewhat clasping, finely about 5-nerved. Spikes mostly clustered, long (40, becoming 75 mm.), with half a dozen rather slender oblong joints some 20- to 40-flowered in 6 series: peduncle 2 mm. long: scales rather truncate, evanescently ciliate. Fruit?—Plate 96.

Brazilian region.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro (*Glaziov*, 4004,—the type).

Phorandendron amplectens n. sp.

More or less pseudodichotomous, the long branches with basal cataphyls only, dioecious?. Internodes long (4-7x60-75 mm. or more, the upper acutely and often undulately 4-winged. Cataphyls a single pair, basal, tubular. Leaves more or less falcately broadly lanceolate or oblanceolate, very obtuse, 2.5-5x7-10 or 15 cm., somewhat evidently 5- or 7-nerved, cuneately contracted for 15 or 20 mm. into a subpetiolar base 4-5 mm. wide, which is abruptly dilated and clasping. Spikes mostly clustered, rather long (30, lengthening to 50 mm.), with about 5 rather slender joints turbinate 30- to 50-flowered in 6 series: peduncle 3 mm. long: scales subtruncate, scarcely ciliate. Fruit (immature) subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 95.

Andean region (? exclusively) on other mistletoes.—The type from Ecuador.

Specimens examined:—ECUADOR. Without locality (*Sodi*ro, 148/21, 1882,—the type). Quisaya (*Sodi*ro, 1874).

Phorandendron turbinispicum n. sp.

Scarcely forked, the elongated branches with basal cataphyls only, dioecious?. Internodes rather long (3-5x30-100 mm.), rather transiently 4-angled. Cataphyls mostly a nearly basal pair and a second some 20 mm. higher, tubular, white-margined. Leaves ovate-lanceolate, obtusely somewhat acuminate, 2.5-4x7-10 cm., scarcely nerved, cuneately sessile. Spikes solitary, long?, with evidently several rather stout joints turbinate 40- to 60-flowered in 4+2 series: peduncle about 5 mm. long: scales scarcely ciliate. Fruit (immature) subglobose: sepals inflexed.—Plate 96.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA, Quindiu, Mariquita (*Triana*, 2777, 1851-7,—the type).

17. BREVIFOLIAE.

Leaves small, thick, dull, scarcely veined, basinerved. Shoots, if at first somewhat compressed, quickly terete. Cataphyls a single nearly

basal pair, on the basal joint only. Flowers in 4 or 4+2 series. Southern Mexico and Central America.

Leaves very small (3x10 mm.).

P. brevifolium.

Leaves moderate (fully 10x30 mm.).

Cataphyls basal.

Leaves rather small (20x40 mm.).

P. Rondeletiae.

Leaves rather large (30x50 mm.).

P. vulcanicum.

Cataphyls above the base: leaves crisped.

P. crispum.

PHORADENDRON BREVIFOLIUM Oliver.

Phoradendron brevifolium Oliver, Vidensk. Meddel. Naturhist. Foren. Kjöbenhavn. 1864. p. 176.

Somewhat pseudodichotomous, at first varnished, the rather long branches with basal cataphyls only, dioecious?. Internodes rather long (2-3x50-70 mm.), transiently somewhat squarish. Cataphyls a single pair, about 5 mm. above the base, tubular-bifid, somewhat scarious-margined. Leaves narrowly elliptical or oblong, very obtuse. small (.3x1-1.2 cm.), sessile. Spikes often clustered, rather long (becoming 40 or 50 mm. in fruit), with about 4 moderate joints clavately 8- to 18-flowered about the middle in 4+2 series: peduncle scarcely 3 mm. long: scales evanescently scarious-fimbriate. Fruit (immature) rather oblong, smooth, scarcely 3 mm. long: sepals closely inflexd.—Plate 97.

Cordilleran region of Mexico.—The type from Tehuacan.

Specimens examined:—MEXICO. Tehuacan, Puebla (*Liebmann*, 16, 3084, 1841,—the type; *Rose, Painter & Rose*, 9965). Teotitlan, Oax. (*Conzatti*, 2124).

Phoradendron Rondeletiae n. sp.

Somewhat pseudodichotomous, the rather short branches with basal cataphyls only, androgynous?. Internodes short (2-4x10-30 mm.), smooth, for a time rather ancipitally flattened, somewhat dilated below the nodes. Cataphyls a single pair, less than 5 mm. above the base, annular. Leaves elliptical-obovate, 1-2x3-4 cm., cuneately petioled for about 5 mm. Spikes solitary, short (10-15 mm.), with 2 or 3 short joints some 4- to 10-flowered in 4 or 4+2 series: peduncle nearly suppressed. Fruit globose, smooth, 4 mm. in diameter: sepals erect, spreading.—Plate 98.

Guatemalan region (? exclusively) on *Rondeletia*.—The type from Coban.

Specimens examined:—GUATEMALA. Coban, Alta Verapaz (v. *Tuerckheim*, ii, 2045, Dec. 1907,—the type). Samac (v. *Tuerckheim*, 435).

Phoradendron vulcanicum n. sp.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes moderate, (2.5x40-70 mm.), smooth, somewhat compressed and dilated below the nodes but not angular. Cataphyls a single nearly basal pair, acute. Leaves broadly elliptical to ovate or obovate, very obtuse, 2.5-3x4-6.5 cm., rather abruptly petioled for about 5 mm. Spikes mostly clustered, short (10 mm.), with 2 or 3 short joints some 10-flowered in 4+2 series: peduncle nearly suppressed. Fruit?—Plate 99.

Guatemalan region (? exclusively) on Leguminosae.—The type from Acatenango.

Specimens examined:—GUATEMALA. Volcan Acatenango, Sacatepequez (*Kellerman*, 4829, Feb. 20, 1905,—the type). Volcan Fuego, Sacatepequez (*Kellerman*, 4551).

Phoradendron crispum n. sp.

More or less verticillate, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2-3x40 mm.), smooth, essentially terete. Cataphyls a single pair, 10-20 mm. above the base, short and spreading. Leaves round-obovate, much crisped in drying, very obtuse, 1.5-2.5x3-5 cm., rather abruptly petioled for about 5 mm. Spikes mostly solitary, short (15 mm.), with 2 or 3 short rather slender joints some 16- to 20-flowered in 4+2 series: peduncle 2 mm. long. Fruit?—Plate 99.

Isthmian region (? exclusively) on Myrtaceae.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Locality? (*Pittier*, 14117, Dec. 31, 1900,—the type). Volcan de Poas (*Pittier*, 816).

18. ROBUSTISSIMAE.

Leaves rather large and broad, thick, dull and obscurely basinerved. Shoots 2-edged or terete. Cataphyls usually a single pair, on the basal joint only. Flowers in 4, 4+2 or 6 series. Fruit nearly round, smooth, with closed sepals. Mountain regions of Mexico and Central America.

Internodes for a time strongly 2-edged: leaves ovate-lanceolate.

P. Reichenbachianum.

Internodes not 2-edged.

Leaves elliptical.

P. robustissimum.

Leaves lanceolate.

P. falcifolium.

PHORADENDRON REICHENBACHIANUM Oliver.

Phoradendron Reichenbachianum Oliver, Vidensk. Meddel. Naturhist.

Foren. Kjöbenhavn. 1864. p. 175.

Viscum Reichenbachianum Seemann, Bot. Herald. p. 296. pl. 62. 1852-7.

Scarcely forked, the long stout branches with basal cataphyls only, dioecious. Internodes moderately long (5-10x50-100 mm.), from sharply ancipital becoming terete. Cataphyls a single pair, 5 mm. above the base, not tubular. Leaves ovate-lanceolate or elliptical-lanceolate, obtuse, 3-4x8-10 cm., thick and dull, rather abruptly petioled for 10-15 mm. Spikes mostly clustered, rather long (30-50 mm.), smooth, stout, with about 6 globose joints some 8- to 10-flowered when pistillate and 12- to 30-flowered in 4+2 series when staminate: peduncle 3-5 mm. long: scales little or transiently ciliate. Fruit (immature) subglobose, nearly smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 100.

Western Sierra Madre and Cordilleran regions of Mexico (? exclusively) on *Quercus*.—The type from western Mexico.

Specimens examined:—MEXICO. Sierra Madre, N. W. Mexico (*Seemann*, 2141,—the type of *V. Reichenbachianum*). Jalisco (*Diguet*, 108). Tlalpujahua, near Toluca (*Diguet*). Jordana, near Toluca (*Gregg*, 722, 1849). Without locality (*Graham*, 233).

PHORADENDRON ROBUSTISSIMUM Eichler.

Phoradendron robustissimum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 122. 1868.

Somewhat pseudodichotomous, microscopically cellular-papillate throughout, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (2-5x50-70 mm.), transiently somewhat rhombically compressed becoming terete. Cataphyls a single pair, nearly basal, scarcely tubular. Leaves elliptical or subovate, obtuse or retuse, 2.5-3.5x4.5-6.5 or even 5x8 cm., abruptly cunate-petioled for 5 mm. Spikes mostly clustered, rather long (30-50 mm.), with about 5 moderate joints some 16-flowered in 4 series when pistillate: peduncle 3-5 mm. long: scales scarcely ciliate. Fruit (immature) elongated, smooth, 3x5 mm.: sepals closely inflexed.—Plate 101.

Isthmian region.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Ojos de Agua (*Hoffmann*, 360, Dec. 1856,—the type). Nicoya (*Tonduz*, 13705).

Phoradendron robustissimum simulans n. var.

Leaves elongated-elliptical, 3-5x8-12 cm., obtuse, with a heavy apical mucro, rather gradually cuneate at base. Staminate spikes with the

joints 30- to 50-flowered in 4+2 series. Approaching the next species.—Plate 102.

Guatemalan and Isthmian regions.—The type from San Salvador.

Specimens examined:—GUATEMALA. Masagua, Escuintla (*Smith*, 2097). Dept. Guatemala (*Kellerman*, 5100). Fiscal (*Deam*, 6099). Without locality (*Friedrichsthal*, 1841). EL SALVADOR. San Salvador (*Renson*, 284, 1908,—the type). NICARAGUA. Without locality (*Rothschuh*, 464). Matagalpa (*Preuss*, 1372). COSTA RICA. El Rodeo (*Pittier*, 1637).

***Phoradendron falcifolium* n. sp.**

Scarcely forked, microscopically cellular-papillate, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (3-4x50-70 mm.), transiently somewhat compressed and dilated below the nodes becoming terete. Cataphyls a single pair, nearly basal, scarcely tubular. Leaves broadly lanceolate, falcate, obtuse, 2.5-4x10-14 cm., cuneately subpetioled for 15-25 mm. Spikes clustered, moderate (30 mm.), with about 6 moderate subglobose joints 20- to 30-flowered in 6 series: peduncle scarcely 20 mm. long: scales transiently and minutely ciliate. Fruit?—Plate 100.

Guatemalan region.—The type from Baja Vera Paz.

Specimens examined:—GUATEMALA. Sta. Rosa, Baja Vera Paz (*v. Tuerckheim*, ii, 2168, Mar. 1908,—the type).

19. CORIACEAE.

Leaves rather small, dull, obscurely basinerved. Shoots 2-edged or terete. Cataphyls 1-3 or 4 pairs, on the basal joint only. Flowers in 4, 4+2, or 6 series. Fruit round or ellipsoid, smooth, with variously inflexed or parted sepals. South America.

Stems not very nodose.

Leaves smooth.

Lanceolate.

Ob lanceolate-obovate.

Lance-elliptical or ovate.

Narrowly oblong.

Leaves drying rough-granular.

Internodes quickly terete.

Leaves linear.

Leaves rather lanceolate.

Internodes 2-edged.

Stems much swollen at the nodes: leaves linear-ob lanceolate.

P. congestum.

P. caripense.

P. Herbert-Smithii.

P. exiguum.

P. stenophyllum.

P. coriaceum.

P. ulophyllum.

P. habrostachyum.

Phoradendron congestum n. nom.

Phoradendron rubrum var. *longifolia* Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 121. 1868.

Not forked, the moderate rather slender branches with basal cataphyls only, dioecious?. Internodes rather short (2x25-40 mm.), smooth, rhombically compressed and rather persistently 2-edged. Cataphyls a single pair, nearly basal, scarcely tubular. Leaves falcately lanceolate, very obtuse, 1.5-2x7-10 cm., rather evidently about 5-nerved, cuneately subpetioled for about 5 mm. Spikes mostly clustered, typically short (10-15, but becoming 30 or 40 mm. in some cases), with about 3 slender joints 8- to 30-flowered in 4 series: peduncle 5 mm. long: scales nearly truncate, little ciliate. Fruit subglobose, scarcely 3 mm. in diameter, smooth: sepals inflexed but scarcely meeting.—Plates 103, 104.

Brazilian region.—The type from Goyaz.

Specimens examined:—BRAZIL. Goyaz (*Gardner*, 3764, 1837-1841,—the type of *P. rubrum longifolium*. A specimen of the same collection in the Berlin herbarium bears, evidently by error, the number 3765).

PHORADENDRON CARIPENSE Eichler.

Phoradendron caripense Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 111. 1868.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x40-50 mm.), smooth, for a time 2-edged. Cataphyls 1 or rarely 2 pairs, toward the base, scarcely tubular or scarious. Leaves obliquely oblanceolate, very obtuse, 2x3.5-6 cm., cuneately subpetioled for about 5 mm. Spikes little clustered, short (scarcely 20 mm.), with about 3 slender joints about 30-flowered in 6 series: peduncle short: scales scarcely scarious or ciliate. Fruit?.—Plate 104.

Brazilian region.—The type from Para.

Specimens examined:—BRAZIL. Caripi, near Para (*Spruce*, 140, Aug. 1849,—the type).

Phoradendron Herbert-Smithii n. sp.

Pseudodichotomous or verticillate, the long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x40-70 mm.), smooth, somewhat compressed but soon terete. Cataphyls 1 or rarely 2 nearly basal pairs, bluntly spreading, white-margined. Leaves elliptical-lanceolate, very obtuse to subemarginate, 2-2.5x3-6 or even 4x9 cm., cuneately narrowed for about 5 mm. rather than petioled. Spikes almost solitary, rather long (20, becoming 40-60 mm.), with half a dozen rather

elongated slender joints some 10-flowered when pistillate or with thrice this number of flowers in 4+2 series when staminate: peduncle scarcely 2 mm. long: scales and receptacular cups somewhat ciliate. Fruit ovoid, nearly smooth, 3x4 mm.: sepals ascending, slightly parted.—Plate 105.

Venezuelan-Isthmian region.—The type from Colombia.

Specimens examined:—COLOMBIA. Sta. Marta, near Bonda, almost at sea-level (*Herbert H. Smith*, 1283,—the type).

***Phoradendron exiguum* n. sp.**

More or less pseudodichotomous or verticillate, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x20-40 mm.), smooth, soon terete. Cataphyls a single nearly basal pair, tubular-bifid, somewhat white-margined. Leaves oblong or oblong-lanceolate, very obtuse, .5-1x4-6 cm., cuneately subpetioled for scarcely 3 mm. Spikes mostly solitary, rather long (20-40 mm.), with 3 or 4 very slender joints scarcely 14-flowered in 4+2 series: peduncle 2-3 mm. long, sometimes with an additional pair of scales. Fruit (immature) ellipsoidal, somewhat wrinkled, 2x3 mm.: sepals somewhat parted.—Plate 106.

Venezuelan-Isthmian region.—The type from Colombia.

Specimens examined:—COLOMBIA. Sta. Marta, near Bonda (*Smith*, 1281,—the type).

***Phoradendron stenophyllum* n. sp.**

Somewhat pseudodichotomous, the moderate slender branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x15-60 mm.), nearly or quite smooth, from very slightly compressed quickly terete. Cataphyls a basal pair often followed at 5 or 10 mm. by a second pair, spreading, white-margined. Leaves narrowly oblong or linear, often falcate or somewhat recurved, acute or mucronate, .3-.4x3-5 cm., sessile. Spikes more or less clustered, moderate (becoming 35-40 mm.), with about 4 rather slenderly fusiform joints some 10-flowered in 4+2 series when pistillate: peduncle 3-12 mm. long, sometimes with a nearly basal pair of scales: scales scarcely scarious or ciliate. Fruit (immature) subglobose, 3 mm. in diameter, smooth: sepals meeting.—Plate 106.

Brazilian region.—The type from Bahia.

Specimens examined:—BRAZIL. Machado Portello, Bahia (*Rose & Russell*, 19908, June 1915,—the type).

PHORADENDRON CORIACEUM von Martius.

Phoradendron coriaceum von Martius,—Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 121. 1868.

Somewhat pseudodichotomous, the moderate rather slender branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x30-70 mm.), smooth, from very slightly compressed quickly terete. Cataphyls a single pair toward the base, or a second or rarely a third and fourth pair closely following, scarcely tubular, white-margined. Leaves lanceolate to elliptical-oblongate, very obtuse, 1.5-2.5x5-7 cm., cuneately subpetioled for scarcely 5 mm. Spikes more or less clustered, rather short (20, lengthening to 30 mm.), with 3 or 4 somewhat tumid joints scarcely 10-flowered in 4+2 series when pistillate: peduncle scarcely 2 mm. long, followed by one or two sterile joints: scales scarious-margined, evanescently ciliate. Fruit ovoid, 3x4 mm., smooth: sepals inflexed.—Plate 107.

Brazilian region.—The type from Minas Geraes.

Specimens examined:—BRAZIL. Minas Geraes (*v. Martius*,—the type). Piahy (*Gardner*, 2625). Alagoas (*Gardner*, 1319).

With transiently somewhat 2-edged internodes and foliage connecting the type with *P. ulophyllum*, to which in some respects it rather pertains, it is *Phoradendron coriaceum quintense* Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 13. 1897, from Quinta, Rio de Janeiro (*Glaziov*, 4010).—Plate 107.

PHORADENDRON ULOPHYLLUM Eichler.

Phoradendron ulophyllum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 123. 1868.

Somewhat pseudodichotomous, the moderate slender branches with basal cataphyls only, dioecious?. Internodes rather short (2x30-50 mm.), smooth, the upper rhombically 2-edged. Cataphyls a single pair toward the base, or one or two additional pairs at intervals of about 5 mm., scarcely tubular, white-margined. Leaves more or less obovately oblongate, 1.5-2x4-8 cm., cuneately subpetioled for about 5 mm. Spikes little clustered, rather short (20-25 or 30 mm.), with about 4 rather tumid joints some 14-flowered in 4+2 series when pistillate: peduncle 1-3 mm. long, often followed by a sterile joint: scales scarious-margined, scarcely ciliate. Fruit elliptical, 3x4 mm., smooth: sepals inflexed.—Plate 108.

Brazilian region.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro (*Gaudichaud*, 573,—the type; and in the Vienna herbarium as 473, 1833; *Glaziov*, 4009, 7663, 8730).

PHORADENDRON HABROSTACHYUM Eichler.

Phoradendron habrostachyum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 111. 1868.

Scarcely forked, the moderate rather slender branches with basal cataphyls only, dioecious, or monoecious on separate shoots. Internodes

short (2-3x20-30 mm.), smooth, the upper ancipital and dilated to 5 or 6 mm. below the nodes. Cataphyls 2-4 pairs, toward the base, scarcely tubular. Leaves narrowly oblanceolate, very obtuse, scarcely 1x4 cm., scarcely nerved, cuneately subpetioled for about 5 mm. Spikes more or less clustered, moderate (scarcely 25 mm.), with 3-6 slender joints somewhat turbinate about 30-flowered when staminate and clavately half as many flowered in 6 series when pistillate: peduncle 1-2 mm. long: scales scarcely ciliate. Fruit said to be pale yellow, globose, smooth, 2.5-3 mm. in diameter.—Plate 109.

Brazilian region.—The type from Minas Geraes (v. *Martius*,—the type).

Specimens examined:—BRAZIL. Minas Geraes (v. *Martius*,—the type).

20. RIGIDAE.

Leaves moderate, thick, dull, scarcely evidently basinerved. Shoots more or less compressed or ancipital. Cataphyls mostly 2 or 3 pairs, on the basal joint only, exceptionally fertile. Spikes short, with small scales. Flowers in 2, 4 or 6 series. Fruit mostly round, smooth and with nearly closed sepals. Venezuela.

Leaves round-ovate (1:1.5).

P. ovalifolium.

Leaves oblanceolate.

Very obtuse.

P. longipetiolatum.

Subacute.

P. bilineatum.

Leaves elliptical-obovate (1:2).

Subsessile.

P. rigidum.

Long-cuneate.

P. Jenmani.

PHORADENDRON OVALIFOLIUM (Urban).

Phoradendrum ovalifolium Urban, Bot. Jahrb. vol. 23, Beibl. 57. p. 6. 1897.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (1-3x15-60 mm.), smooth, terete. Cataphyls a nearly basal pair, usually with a second pair 5-10 mm. higher, bluntly spreading, white-margined. Leaves broadly ovate to obovate, obtuse or subemarginate, 1.5-3x2.5-4 cm., rather abruptly petioled for 5-10 mm. Spikes mostly solitary, short (15, lengthening to 25 mm.), with about 3 joints some 6- to 10-flowered in 4+2 series: peduncle scarcely 2 mm. long, sometimes followed by a more or less sterile joint: scales white-margined. Fruit subglobose, nearly smooth, 3-4 mm. in diameter: sepals inflexed.—Plate 110.

Venezuelan region.—The type from Venezuela.

Specimens examined.—VENEZUELA. Tovar (*Fendler*, 1108,—the type).

PHORADENDRON LONGIPETIOLATUM (Urban).

Phoradendrum longipetiolatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 6. 1897.

Scarcely forked, the elongated branches with basal cataphyls only, androgynous. Internodes rather long (2.5x50-70 mm.), smooth, the upper compressed rather than ancipital. Cataphyls usually a nearly basal pair followed by a second some 5 mm. higher, tubular-bifid, white-margined, exceptionally floriferous like the spike-scales. Leaves falcately narrowly lanceolate to oblanceolate, somewhat mucronately very obtuse, 1.5-3x5-10 cm., cuneately attenuate at base for 10-20 mm. Spikes often clustered, short (15-20 mm.), with about 3 short joints some 20-flowered in 6 series: peduncle 3 mm. long: scales evanescently ciliate. Fruit (immature) subglobose, smooth.—Plate 111.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1762,—the type).

PHORADENDRON BILINEATUM (Urban).

Phoradendrum bilineatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 5. 1897.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, androgynous?. Internodes rather long (2-4x50-60 mm.), smooth, the upper somewhat ancipital, with 2 rather persistent keels. Cataphyls a single nearly basal pair, scarcely tubular, sometimes subtending spikes. Leaves falcately lanceolate, subacute and often mucronate, 2-3.5x9-11 cm., cuneately petioled for 10-15 mm. Spikes mostly solitary, moderate (30 mm.), with about 3 joints some 20-flowered in 4+2 series: peduncle 3 mm. long: scales scarcely ciliate. Fruit subglobose, 3 mm. in diameter, nearly smooth: sepals suberect.—Plate 112.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1811,—the type).

PHORADENDRON RIGIDUM (Urban).

Phoradendrum rigidum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 7. 1897.

Scarcely forked, the elongated branches with basal cataphyls only, androgynous. Internodes rather long (3-5x40-70 mm.), smooth, the upper ancipital and dilated below the nodes. Cataphyls usually 2, or sometimes 3 or 4 pairs, the lowermost shortly above the base, the others at increasing intervals of 10-30 mm., tubular-bifid, white-margined, sometimes fertile. Leaves elliptical-obovate, submucronately very obtuse, 3x6-8 cm., cuneately contracted for about 5 mm. rather than petioled,

very obscurely subpinnately nerved. Spikes solitary, short (20 mm.), with 2 or 3 somewhat fusiform joints some 10-flowered when pistillate as the upper are, and twice as numerous when staminate, as are the lower, in 4+2 or 6 series: peduncle scarcely 2 mm. long. Fruit (immature) subglobose, nearly smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 113.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1105,—the type).

Phoradendron Jenmani n. sp.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (2-3x30-80 mm.), smooth, nearly terete. Cataphyls a more or less closely basal pair followed at 10-20 mm. by another, a third pair sometimes intervening, tubular-bifid. Leaves elliptical-obovate, very obtuse, 3-4x4-7 cm., cuneately subpetioled for about 10 mm. Spikes more or less clustered, moderate (20-30 mm.), with about 3 short slender joints about 4-flowered in 2 series: peduncle 3 mm. long, usually with a basal pair of scales. Fruit ovoid, nearly smooth, 4x6 mm.: sepals somewhat parted.—Plate 114.

Cayenne region.—The type from Demerara.

Specimens examined:—BRITISH GUIANA. Bartica (*Jenman*, 2541, 4678—the type).

21. POLYGYNÆ.

Leaves moderately large and broad, thick, basinerved. Shoots ancipital or 4-sided but not winged. Cataphyls a single pair, on the basal joint only. Spikes long, with large scale-cups. Flowers in 4+2 or 6 series. Fruit round, smooth, with closed sepals. Andes.

Leaves dull, without evident nerves.

P. polygynum.

Leaves somewhat glossy, distinctly 3-nerved.

P. Briquetianum.

PHORADENDRON POLYGYNUM Eichler.

Phoradendron polygynum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 124. 1868.

Spiciviscum polygynum Karsten, Fl. Columb. vol. 1. fasc. 2. p. 73. pl. 36. 1859.—Schnitzlein, Iconographie. pl. 108.

Scarcely forked, the long branches with basal cataphyls only, androgynous. Internodes rather long (2-5x30-100 mm.), smooth, the upper rhombically ancipital or 4-sided, somewhat dilated below the nodes. Cataphyls a single pair, somewhat above the base, tubular. Leaves elliptical-obovate to lanceolate, very obtuse, 3-5x6-12 cm., cuneately subsessile, dull and very obscurely subpinnately nerved. Spikes more or less clustered,

very long (120-160 mm.), with about 8 stout oblong joints some 60- to 80-flowered in 4+2 or 6 series, those from the upper nodes pistillate, and those from the lowermost staminate: peduncle 5 mm. long: scales toward the base forming deep funnel-shaped tubes. Fruit (immature) subglobose, nearly smooth, 3 mm. in diameter: sepals closely inflexed.—Plates 115-116.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1104). The type, superbly pictured by its author, came from Lake Tacarigua, Caracas (*Karsten*).

PHORADENDRON BRIQUETIANUM Trelease.

Phoradendron Briquetianum Trelease, *Annuaire du Conserv. Jard. Bot.*, Genève. vol. 15-16. p. 351. 1913.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x30-60 mm.), smooth, the upper ancipital and somewhat dilated below the nodes. Cataphyls a single pair, about 8 mm. above the base, tubular. Leaves narrowly elliptical-oblong to broadly obovate, mucronately subacute to very obtuse or emarginate, 1 or 1.5-3x5-6 cm., cuneately subpetioled for 10 mm., rather evidently about 3-nerved, drying glossy. Spikes mostly solitary, long (fully 50 mm.), with some 3 oblong joints about 80-flowered in 6 series: peduncle 5-8 mm. long: scales not very long. Fruit?—Plate 117.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA. Bogotá (*Linden*, 796, Dec. 1842, —the type; *Holton*, 658).

22. OBLIQUEAE.

Leaves large, dimidiately elliptical or lanceolate, fleshy, basinerved. Shoots nearly terete. Flowers in 4+2 or 6 series. Fruit round, smooth, with closed sepals. Andes.

Leaves very large and thick.

P. obliquum.

PHORADENDRON OBLIQUUM Eichler.

Phoradendron obliquum Eichler in v. Martius, *Fl. Brasil*. vol. 5. pt. 2. p. 134 m. 1868.

Phoradendrum obliquum Urban, *Bot. Jahrb.* vol. 23. Beibl. 57. p. 2. 1897.

Viscum obliquum Presl, *Epimel. Bot.* p. 255. 1849.

Large, brittle, with basal cataphyls only?, androgynous?. Internodes thick and long (5x100 mm. or more), transversely rugulose, nearly terete, somewhat enlarged at the nodes. Cataphyls a nearly basal pair sometimes closely followed by another, and usually with a pair some 20-30

mm. higher, tubular. Leaves falcately or dimidiately lanceolate, very obtuse, 4-8x10-23 cm., cuneately thick-petioled for 10-20 mm. Spikes rather long (50-60 mm.), with half a dozen short swollen joints some 24- to 40-flowered in 4+2 or 6 series: peduncle stout, scarcely 5 mm. long, with about 3 pairs of scales. Fruit (immature) subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 117.

Andean region.—The type from Peru.

Specimens examined:—PERU. Huannoca Mts. (*Haenke*,—the type of *V. obliquum* in the Bohemian Museum at Prag and, without data, in the herbarium of the German University at Prag). ECUADOR. Niebly (*Sodiro*, a, July 1873). Sto. Domingo to S. Nicolas (*Sodiro*, 148/16, Sept. 1892).

23. DIMIDIATAE.

Leaves rather large, dimidiately lance-elliptical, drying rather thin and basinnerved. Shoots subterete to ancipital. Cataphyls 1 or frequently 2 or 3 pairs, on the basal joint only. Flowers in 4+2 or 6 series. Fruit round, cellular-papillate, with closed sepals. Eastern South America.

Shoots nearly terete.

Spikes moderate (50-70 mm.).

P. dimidiatum.

Spikes very long (finally 100 mm. or more).

P. Perrottetii.

Shoots 2-edged.

P. bathyoryctum.

PHORADENDRON DIMIDIATUM Eichler.

Phoradendron dimidiatum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 m. 1868.

Phoradendrum dimidiatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 9. 1897.

Viscum dimidiatum Miquel, Linnaea. vol. 18. p. 58. 1844.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-50 mm.), smooth, slightly compressed. Cataphyls a pair somewhat above the base, sometimes followed by a second some 10 mm. higher. Leaves more or less obliquely or even dimidiately elliptical or sub lanceolate, very obtuse, 2.5-3.5x6.5-10 cm., cuneately wing-petioled for 10 mm. Spikes solitary, rather long (50-70 mm.), with half a dozen fusiform joints some 18- to 24- or fully 50-flowered in 4+2 or 6 series: peduncle 3-5 mm. long. Fruit?—Plate 118.

Cayenne region (? exclusively) on *Citrus*.—The type from Surinam.

Specimens examined:—SURINAM. Orellana Creek (*Focke*, 716,—the type of *V. dimidiatum*).

PHORADENDRON PERROTTETII Eichler.

Phoradendron Perrottetii Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 112. 1868.

Viscum Perrottetii de Candolle, Prodromus. vol. 4. p. 280. 1830.

Not forked, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x30-90 mm.), nearly smooth, little compressed and soon terete. Cataphyls a single pair some 5 mm. above the base or occasionally 2 or 3 pairs at short intervals, blunt and spreading. Leaves falcately or dimidiately elliptical or lance-elliptical, very obtuse, 3-4x9-12 cm., cuneately subpetioled for 5-10 mm. Spikes more or less clustered, long (30-50, becoming 100-130 mm.), with about 5 moderately thickened oblong joints some 18- to 30- or 40-flowered in 4+2 or 6 series: peduncle scarcely 5 mm. long, usually followed by a nearly or quite sterile joint. Fruit said to be whitish, subglobose, minutely cellular-papillate, 3-4 mm. in diameter: sepals closely inflexed.—Plate 119.

Cayenne region.—The type from Cayenne.

Specimens examined:—FRENCH GUIANA (*Perrottet*, 228, 1820,—the type of *V. Perrottetii*; *Sagot*, 1291; *Gabriel*, 1802; *Martin*; *Leprieur*, 97, 194, 195, 1835, 1839). BRITISH GUIANA (*Jenman*, 2247, 22542, 3795, 4821).

Though the binomial of this species under *Phoradendron* must be ascribed to Eichler, the Brazilian material referred here by him is rather of *P. bathyoryctum*, neither species appearing to cross the Amazon valley.

PHORADENDRON BATHYORYCTUM Eichler.

Phoradendron bathyoryctum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 123. pl. 43. 1868.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes rather long (2-5x60-100 mm.), cellular-papillate, the upper more or less rhombically ancipital and enlarged at the nodes. Cataphyls a single nearly basal pair, spreading. Leaves more or less obliquely elliptical to oblong, very obtuse, 2x6 to mostly 4-7x10-15 cm., cuneately subpetioled for 5-10 mm. Spikes more or less clustered, long (becoming 80-90 mm.), with about 4 thick oblong joints turbinate some 30-flowered in 4 or 4+2 or exceptionally 6 series: peduncle 5 mm. long, sometimes with a pair of basal scales. Fruit subglobose, minutely cellular-papillate, 3-4 mm. in diameter: sepals closely inflexed.—Plate 120.

Brazilian region, on *Ficus*, *Odena*, etc.—The type from Piahy.

Specimens examined:—BRAZIL. Piahy (*Gardner*, 2626,—taken as type, 2618, 2621; 3763—the type of *P. Perrottetii* var. *parvifolia* Eichler, l. c. p. 113, 1868). Ceara (*Gardner*, 1680). [Goyaz?] (*Gardner*, 3762,

3765). Bahia (*Blanchet*). Rio Negro (*v. Martius*). Lagoa Santa (*Warming*, 15, 369). Porto Alegre (*Czermak & Reineck*, 199,—with 2-3 pairs of cataphyls). Without locality (*Lund*, 21; *Riedl*). BOLIVIA. Sta. Cruz (*Kuntze*, 1). Mattogrosso (*Kuntze*, 3, 36). E. Velasco (*Kuntze*, 4).

24. NITENTES.

Leaves moderate, elliptical to narrowly lanceolate, drying glossy and bronzed or golden, basinnerved. Shoots compressed for a time. Cataphyls 1-4 pairs, on the basal joint only. Flowers in 4+2 series. Fruit globose, with inflexed sepals. South America.

Cataphyls not subtending spikes.

Leaves lance-elliptical.

Rather large.

P. pellucidulum.

Rather small.

P. holoxanthum.

Leaves narrowly lanceolate.

Spike-joints sometimes 20-flowered.

P. nitidum.

Spike-joints scarcely 6-flowered.

P. Selloi.

Upper cataphyls subtending flower-spikes.

P. craspedophyllum.

PHORADENDRON PELLUCIDULUM Eichler.

Phoradendron pellucidulum Eichler in *v. Martius*, Fl. Brasil. vol. 5. pt. 2. p. 112. 1868.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes rather short (2.5x20-40 mm.), dilated below the nodes. Cataphyls a basal pair, sometimes rather closely followed by a second or third pair, annular. Leaves obliquely elliptical to lance-oblong, very obtuse, 2.5-3.5x7-9 cm., cuneately petioled for about 5 mm. Spikes more or less clustered, short (20 mm.), with about 3 slightly fusiform slender joints some 8- to 18-flowered in 4+2 series: peduncle very short, usually with a basal pair of scales. Fruit reddish, ellipsoidal, cellular-papillate: sepals closely inflexed.—Plate 121.

Brazilian region.—The type from Rio Negro.

Specimens examined:—BRAZIL. San Carlos, Rio Negro (*Spruce*, 3480, —the type).

PHORADENDRON HOLOXANTHUM Eichler.

Phoradendron holoxanthum Eichler in *v. Martius*, Fl. Brasil. vol. 5. pt. 2. p. 116. 1868.

Somewhat pseudodichotomous or fasciculate, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2-3x 40-60 mm.), somewhat cellular-papillate, the upper rather sharply anapical. Cataphyls a single pair towards the base or these followed by a

second pair, scarcely tubular. Leaves elliptical, obtuse or emarginate, 2.2.5x5.6 cm., narrowly revolute, cuneately subpetioled for about 5 mm. Spikes often clustered, moderate (15, lengthening in fruit to 40 mm.), with 3 or 4 slender joints scarcely 10-flowered in 4+2 series: peduncle scarcely 3 mm. long, sometimes with a second basal pair of scarcely ciliate scales. Fruit red, globose, 4 mm. in diameter, cellular-papillate and obscurely somewhat low-granular: sepals closely inflexed.—Plate 122.

Brazilian region.—The type from Brazil.

Specimens examined:—BRAZIL. Without locality (*Sello*, 5847),—the type).

***Phoradendron holoxanthum corallispicum* n. var.**

Leaves narrow and more lanceolate, rather acute, 1.1.5x5x7 cm. Spikes diaphanous, red.—Plate 122.

Brazilian region.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro (*Glaziov*, 8729,—the type).

PHORADENDRON NITIDUM Eichler.

Phoradendron nitidum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p 113. 1868.

Viscum nitidum Gardner, Hooker's London Journ. Bot. vol. 4. p. 105. 1845.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2.3x20-50 mm.), smooth and glossy, the upper somewhat compressed. Cataphyls a single nearly basal bifid pair or 2-4 pairs at short intervals. Leaves linear-lanceolate to spatulate-oblong, obtuse, 1.2x8-10 cm., slightly revolute, gradually subpetioled. Spikes mostly solitary, rather short (20 mm.), with about 4 slender joints some 10- to 20-flowered in 4+2 series: peduncle 3 mm. long, sometimes with 1 or 2 large pairs of slightly ciliolate scales. Fruit (immature) subglobose, 3 mm. in diameter, smooth: sepals closely inflexed.—Plate 123.

Brazilian region.—The type from the Organ Mountains.

Specimens examined:—BRAZIL. Organ Mts. at 4000 ft. (*Gardner*, 436,—the type of *V. nitidum*). Minas Geraes (*Lindberg*, 253a). From its 18-flowered spike-joints, may also be referred here a specimen from Rio de Janeiro (*Glaziov*, 4013) otherwise very suggestive of *P. Selloi*.

PHORADENDRON SELLOI Eichler.

Phoradendron Selloi Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 116. 1868.

Somewhat pseudodichotomous, or cymosely forked, the moderate slender branches with basal cataphyls only, androgynous?. Internodes mod-

erate (1-2x20-50 mm.), cellular-papillate, the upper ancipital for a time. Cataphyls a single basal pair or 2 or 3 pairs at intervals of 5-10 mm., scarcely tubular. Leaves narrowly lanceolate, obtuse, scarcely 1x7 cm., narrowly revolute, gradually narrowed to the base. Spikes sometimes truly terminal, mostly solitary, moderate (15, lengthening to 20 or 30 mm.), with 3 or 4 slender joints about 6-flowered in 4+2 series: peduncle scarcely 3 mm. long, sometimes with a second sterile joint: scales very obtuse. Fruit 3 mm. in diameter, cellular-papillate: sepals closely inflexed.—Plate 123.

Brazilian region.—The type from S. Paulo.

Specimens examined:—BRAZIL. [S. Paulo] (*Sello*, 122,—the type).

PHORADENDRON CRASPEDOPHYLLUM Eichler.

Phoradendron craspedophyllum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 124. pl. 37. 1868.

Somewhat pseudodichotomous and fasciculate, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-3x 20-40 mm.), cellular-papillate, the upper somewhat ancipital. Cataphyls a single nearly basal sterile pair, and another pair, fertile as in *P. crassifolium* etc., about the middle of the joint, scarcely tubular. Leaves elliptical to ovate or broadly lanceolate, mucronate, acute to obtuse, 2.5-3x 4.5-6 cm., narrowly revolute, rather abruptly contracted for 5 mm. at base. Spikes often clustered, rather short (10-15 mm.), with about 5 slender joints some 6-flowered in 4+2 series: peduncle 1 mm. long: scales pointed, somewhat ciliate. Fruit globose, 3 mm. in diameter, smooth: sepals closely inflexed.—Plate 124.

Brazilian region.—The type from S. Paulo.

Specimens examined:—BRAZIL. S. Paulo (*Sello*, 155, 1836,—the type; *Burchell*, 4559).

25. LONGIBACCAE.

Leaves moderate, broad or short, basinerved. Shoots compressed or mostly for a time 2-edged. Cataphyls a single pair, on the basal joint only. Flowers in 4 or 4+2 series. Fruit elongated, with erect parted sepals. South America.

Leaves obovate-elliptical.

Abruptly subpetioled, rather thick.

Very cuneate, thin.

Leaves cleaver-shaped to subelliptical.

Leaves oblanceolate, small.

P. craspedophylloides.

P. obtusissimum.

P. acinacifolium.

P. reductum.

Phoradendron craspedophylloides n. sp.

More or less pseudodichotomous or fasciculately branched, with basal cataphyls only, androgynous?. Internodes moderate (2-3x30-50 mm.), slightly cellular-papillate, the upper somewhat compressed. Cataphyls solitary, basal, scarcely tubular. Leaves elliptical, very obtuse or somewhat emarginate, 2-3.5x4.5-6 cm., slightly revolute, rather abruptly contracted into a broad subpetiolar base for some 10 mm., rather thick, drying glossy and golden. Spikes clustered, short (10-15 mm.), with about 3 slender joints some 6-flowered in 4+2 series: peduncle 1 mm. long, usually followed by a longer sterile joint: scales very blunt, ciliate. Fruit ellipsoidal-oblong, about 4x8 mm., smooth: sepals erect.—Plate 124.

Brazilian region.—The type from Bahia.

Specimens examined:—BRAZIL. Vittoria, Bahia (*Sello*,—the type). Piahy (*Gardner*, 2622). “Brasilia tropica” (*Sello*, 234). Without data (*Herb. Link.*).

PHORADENDRON OBTUSISSIMUM Eichler.

Phoradendron obtusissimum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 m. 1868.

Viscum obtusissimum Miquel, Linnaea. vol. 18. p. 602. 1844.

Phoradendrum obtusissimum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 9. 1897.

Somewhat pseudodichotomous, the long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x40-60 mm.), nearly smooth, the upper somewhat rhombically compressed. Cataphyls a single pair, basal, scarcely tubular. Leaves obovate, very obtuse or emarginate, 3-4x5 cm., cuneately narrowed for 10-15 mm. Spikes clustered, short (10 mm.), with 2 or 3 slender joints about 6-flowered in 4 or 4+2 series: peduncle 2 mm. long: scales ciliate. Fruit white, fusiform, 3-4x8-10 mm., smooth: sepals erect.—Plate 125.

Cayenne region.—The type from Surinam.

Specimens examined:—SURINAM. Para Superiore (*Focke*, 1019,—the type of *V. obtusissimum*). BRITISH GUIANA (*Jenman*, 2539, 4678).

PHORADENDRON ACINACIFOLIUM von Martius.

Phoradendron acinacifolium von Martius.—Eichler in von Martius, Fl. Brasil. vol. 5. pt. 2. p. 117. pl. 37. 1868.

More or less pseudodichotomous, the rather long slender branches with basal cataphyls only, androgynous. Internodes rather short (1-2x 20-40 mm.), somewhat cellular-papillate, the upper somewhat compressed and dilated upwards. Cataphyls a single pair, nearly basal, scarcely tubular, ciliate. Leaves rather falcately oblanceolate to obovate-ellip-

tical, very obtuse, 1.5-3x4-6 cm., cuneately slender-subpetioled for 5-10 mm. Spikes often clustered, short (10-15 mm.), with about 3 slender joints some 6-flowered in 4+2 series: peduncle 1 mm. long, sometimes followed by a longer sterile joint: scales blunt, ciliate. Fruit ellipsoidal, equally tapered at both ends, 3-4x6 or even 8-10 mm., smooth: sepals erect or spreading.—Plates 126, 127.

Brazilian region (? exclusively) on Lauraceae and Compositae.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Bahia (*v. Martius*). Rio de Janeiro (*Gaudichaud*, 574,—taken as type; *Sello*, 511, 597; *Mikan*; *Glaziou*, 6073). Falls of Madeira (*Rusby*, 1542). PARAGUAY. Pilcomayo River (*Hassler*, 191; *Morong*, 1546). “Central Paraguay” (*Morong*, 358).

***Phoradendron reductum* n. sp.**

More or less pseudodichotomous, the slender branches with basal cataphyls only, androgynous?. Internodes short and slender (1-2x20-25 mm.), somewhat cellular-papillate, the upper slightly compressed and dilated. Cataphyls a single nearly basal pair, exceptionally followed by a second, scarcely tubular. Leaves oblanceolate or subelliptical, very obtuse, 1x3 cm., cuneately subpetioled for about 3 mm. Spikes short (scarcely 20 mm. in fruit), with about 3 slender joints subverticillately about 6-flowered toward the top: peduncle nearly suppressed, sometimes followed by 1 or 2 sterile joints. Fruit ellipsoidal or ovoid, smooth, 3x5 mm.: sepals erect.—Plate 127.

Brazilian region.—The type from Paraguay.

Specimens examined:—PARAGUAY, “South Paraguay” (*Kuntze*, 15, Sept. 1892,—the type).

26, VERNICOSAE.

Leaves moderate, lanceolate to obovate, rather thin and evidently basinerved. Shoots compressed rather than ancipital. Cataphyls a single pair, on the basal joint only. Flowers usually in 2 decussating series as in *Dendrophthora*. Fruit mostly wrinkled and with closed sepals. Mexico and Central America.

Spikes filiform: shoots much flattened.

Joints several-flowered. Mexico.

Joints 2-flowered. Guatemala.

Spikes thicker though not stout: shoots nearly terete.

Leaves prevailing lanceolate. Honduras.

Leaves prevailing obovate. Yucatan.

P. Waurae.

P. cheirocarpum.

P. decussatum.

P. vernicosum.

Phoradendron Wawrae n. sp.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, dioecious?. Internodes rather slender (1-3x30-60 mm.), somewhat granular, for a time subancepitally flattened and dilated upwards. Cataphyls a single basal pair, very short-annular. Leaves lanceolate or oblanceolate, typically very obtuse, 1.5-3x5-10 cm., cuneately attenuate and subpetioled for about 5 mm. Spikes mostly clustered, short (10-15 mm.), with 3 or 4 filiform joints subverticillately 2- or 4- to 8-flowered near the ends when pistillate: peduncle 2 mm. long, with a pair of basal scales. Fruit (immature) goblet-shaped and with widely parted sepals.—Plate 128.

Eastern Sierra Madre region of Mexico.—The type from Tuxpam.

Specimens examined:—MEXICO. Tuxpam (*Wawra*, 747,—the type). Valley of Cordoba (*Bourgeau*, 1482).

Phoradendron cheiroparpum n. sp.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes moderate (2-3x25-60 mm.), smooth, the upper compressed and dilated to 5 mm. below the nodes. Cataphyls a single basal pair, scarcely tubular. Leaves more or less falcately oblanceolate, very obtuse, 1.5x5-9 cm., somewhat revolutely cuneate for about 5 mm. rather than petioled. Spikes clustered, short (15 mm.), with about 4 slender oblong 2-flowered joints: peduncle 1-2 mm. long: scales blunt, somewhat ciliate. Fruit goblet-shaped, 3x6 mm., the lower half stipitately contracted, smooth: sepals erect or spreading.—Plate 129.

Guatemalan region.—The type from Cubilquitz.

Specimens examined:—GUATEMALA. Cubilquitz, Alta Verapaz (*v. Tuerckheim*, 7661, July 1900,—the type).

Phoradendron decussatum n. sp.

Scarcely forked, the moderately long branches with basal cataphyls only, dioecious. Internodes moderate (2-4x30-70 mm.), minutely papillate, varnished when young, somewhat compressed and enlarged but not angled below the nodes. Cataphyls usually a single pair toward the base, rather acute and spreading. Leaves lanceolate to short-obovate or elliptical, very obtuse, 1.5-2.5x4 or 5-8 cm., cuneately subpetioled for 5 mm. Spikes mostly solitary, rather short (20 mm.), with about 5 round joints decussately 2-flowered when pistillate: peduncle 2 mm. long, with a pair of scales about the middle. Fruit (immature) ovoid, somewhat rugulose, 3x4 mm.: sepals closely inflexed.—Plate 129.

Yucatecan region.—The type from Honduras.

Specimens examined:—HONDURAS. Comyagua to Sabana Larga (*Niederlein*, 95, Feb. 23, 1898,—the type).

PHORADENDRON VERNICOSUM Greenman.

Phoradendron vernicosum Greenman, Publ. Field Columb. Mus., Botany. vol. 2. p. 250. 1897.

Scarcely forked, the moderately long branches with basal cataphyls only, dioecious. Internodes rather short and thick (2.4x20-40 mm.), minutely papillate, varnished when young, elliptically dilated rather than compressed below the nodes. Cataphyls a single pair toward the base, short-annular. Leaves subelliptical or obovate varying into lanceolate, very obtuse, 1-2x2.5-4 cm., cuneately subpetioled for scarcely 5 mm. Spikes often clustered, short (10-15, lengthening to 20 mm.), with 3 or 4 short oblong joints decussately 2-flowered when pistillate: peduncle 1-2 mm. long, sometimes with a second pair of scales. Fruit ovoid, somewhat rugulose-warty, 4x5 mm.: sepals closely inflexed.—Plate 130.

Yucatecan region.—The type from Yucatan.

Specimens examined:—MEXICO. Izamal, Yucatan (*Greenman*, 440, Feb. 22, 1906,—the type). Silan (*Gaumer*, 876, 1895).

27. CAMPBELLIAE.

Leaves moderate, lanceolate, rather herbaceous, basinerved, somewhat veiny. Shoots much flattened or subrhombic. Cataphyls 1 or 2 pairs, on the basal joint only. Pistillate flowers in 2 or 4 series. Fruit round or ovoid, mostly wrinkled, with suberect parted sepals. West Indies.

Shoots 2-edged, dilated upwards.

Leaves obtuse: cataphyls 2 pairs.

P. Fici.

Leaves usually blunt-acuminate: cataphyls 1 pair.

P. Campbellii.

Shoots rhombic in section, little dilated.

P. Grisebachianum.

PHORADENDRON FICI (Urban).

Phoradendrum Fici Urban, Symbolae Antillanae. vol. 5. p. 333. 1907.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes short (2-3x20 mm.), transversely wrinkled in drying, apically compressed and somewhat dilated upwards. Cataphyls a nearly basal pair, usually followed at a short distance by a second or a third pair, truncately annular. Leaves falcately rather broadly lanceolate, obtuse, 1.5-2.5 or even 3x5-9 cm., cuneately subpetioled for about 10 mm. Spikes solitary, moderate (scarcely 30 mm. long), with about 3 slender joints 2- to 6-flowered: peduncle some 5 mm.

long, with a pair of scales near the base. Fruit greenish yellow, ellipsoidal, 3x5 mm., wrinkled: sepals somewhat parted.—Plate 131.

Antillean region (? exclusively) on *Ficus*.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Harris*, 9220, Apr. 19, 1906,—the type; *Britton & Hollick*, 1861).

PHORADENDRON CAMPBELLII (Krug & Urban).

Phoradendrum Campbellii Krug & Urban, Bot. Jahrb. vol. 24. p. 44. 1897.

More or less pseudodichotomous, the elongated spreading branches with basal cataphyls only, dioecious. Internodes rather short (1-3x15-40 mm.), smooth, slightly varnished when young, rhombically ancipital and slightly dilated upwards. Cataphyls a single nearly basal pair, rather spreading. Leaves broadly lanceolate and blunt-acuminate to oblanceolate and very obtuse, 1.5-3x4-8 cm., cuneately subsessile. Spikes more or less clustered, short (10-15 mm.), with 3 or 4 short slender joints decussately 2-flowered or occasionally subverticillately 4-flowered, when pistillate: peduncle scarcely 2 mm. long, sometimes with a second pair of scales. Fruit (immature) ellipsoid, nearly smooth: sepals somewhat parted.—Plate 132.

Antillean region (? exclusively) on *Pisonia* and *Nectandra*.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA. Wareka Road (*Campbell*, 6398 in part, Aug. 10, 1896—the type, 6604). Parish of Manchester (*Britton*, 3703, 3734, 3765, 3773).

PHORADENDRON GRISEBACHIANUM Eichler.

Phoradendron Grisebachianum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 127 without name, 134 m. 1868.

Phoradendrum Grisebachianum Urban, Bot. Jahrb. vol. 24. p. 45. 1897.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious. Internodes rather short (2-3x20-40 mm.), smooth, rhombically ancipital or quadrangular, slightly enlarged upwards. Cataphyls a single pair 2-4 mm. above the base, sometimes followed by a second pair some 10 mm. higher, annular. Leaves broadly lanceolate or ovate-lanceolate to subelliptical, very obtuse or bluntly sub-acuminate, 2.5-4x5-8 or even 8x15 cm., attenuately or rather abruptly wing-petioled for 5-10 mm. Spikes solitary, moderate (30, lengthening to 40 mm.), with about 4 slender joints subverticillately 4- to 8-flowered about the top when pistillate and some 18- to 24-flowered in 6 series when staminate: peduncle 2-5 mm. long, sometimes with a second pair of scales. Fruit orange-scarlet, tipped with yellow, globose, not warty but fleshy

and drying very rugose, 3 mm. in diameter: sepals not meeting.—Plate 133.

Antillean region (? exclusively) on *Coccoloba*, *Ficus* and *Nectandra*.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Alexander*; *Britton*, 965, 977, 1467, 3144, 3215, *Britton & Hollick*, 2772; *Crawford*, 783; *Brown*, 51; *Hansen*, 1897; *Harris*, 6341,—taken as the type, there being no representative in Grisebach's herbarium; 6376, 6397, 10202, 10861).

28. CHRYSOCARPAE.

Leaves moderate, lanceolate or elliptical to round-obovate, rather opaque and dull but often raised-nerved from the base. Shoots mostly 2-edged for a time, sometimes at first rhombically 4-lined. Cataphyls 1 or exceptionally 2 pairs, on the basal joint only. Flowers variously in 2, 4, or 4+2 series. Fruit ovoid, mostly golden-dotted, essentially smooth, with closely inflexed sepals. West Indies.

Leaves lanceolate: flowers numerous.

Broad (up to 4 cm.).

P. chrysocarpum.

Moderate (scarcely 3 cm.).

Stem sharply ancipital.

P. anceps.

Stem quickly terete.

P. Hartii.

Leaves linear-lanceolate: flowers few, sometimes only 2.

P. haitense.

Leaves elliptical.

Strongly nerved: pistillate flowers 2.

P. Wattii.

Obscurely nerved.

Stem ancipital.

Leaves petioled.

P. Helleri.

Leaves sessile.

P. Dussii.

Stem quickly terete.

P. crenulatum.

Leaves round-obovate.

P. Gundlachii.

PHORADENDRON CHRYSOCARPUM (Krug & Urban).

Phoradendrum chrysocarpum Krug & Urban, Bot. Jahrb. vol. 24. p. 39. 1897.

P. martinicense Grisebach, Fl. Br. W. I. p. 314. 1860,—in part.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x40-60 mm.), smooth, sharply ancipital or at first rhombically compressed. Cataphyls a single pair, nearly basal, scarcely tubular, white-margined. Leaves multiform, from rather narrowly lanceolate to round-ovate, characteristically ovate-lanceolate, mucronately very obtuse, 2.5-4x6-8 cm., cuneately narrowed for 5-10 mm. rather than petioled. Spikes mostly clustered, moderate (15-35

or even 45 mm.), with about 3 slender joints mostly 10- to 20-flowered in 4+2 series: peduncle 2-4 mm. long, usually followed by a sterile joint: scales white-margined. Fruit variously said to be white or yellow, ovoid, 3x4-5 mm., smooth, golden-glistening when dry, like other young parts of the plant: sepals closely inflexed.—Plate 134.

Antillean and Caribbean regions.—The type from Puerto Rico.

Specimens examined:—ANTILLES. PUERTO RICO (*Bertero*, 439 in part,—the type; *Eggers*, 880, 1147; *Sintenis*, 339b, 887, 4894, 5297, 6060; *Garber*, 11; *Gundlach*, 1472; *Krug*, 537; *Stahl*, 1043b; *Britton*, *Britton & Marble*, 1946; *Britton & Cowell*, 1301, 1352; *Britton & Shafer*, 1831; *Underwood & Griggs*, 671; *Stevens*, 5825, 5825a, 5899, 5931). ST. THOMAS (*Shafer & Fitch*, 1472). CARIBBEES. ST. CROIX (*Ricksecker*, 302). GUADELOUPE (*Duss*, 2966, 2969 in part, 3902 in part, 4418 in part). DOMINICA (*Imray*, 212; *Eggers*, 926). MARTINIQUE (*Duss*, 101 in part, 1374b in part, 4418 in part; *Hahn*, 550, 733, 1132). ST. VINCENT (*Smith*, 245 in part, 1305; *Herb. Hooker.*; *Herb. Haynald.*).

PHORADENDRON ANCEPS (Krug & Urban).

Phoradendrum anceps Krug & Urban, Bot. Jahrb. vol. 24. p. 40. 1897. *Viscum anceps* Sprengel, Syst. vol. 1. p. 487. 1825.—de Candolle, Prodr. mus. vol. 4. p. 282.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x40-50 mm.), smooth, compressed or 2-keeled. Cataphyls a single pair, nearly basal, slightly tubular, white-margined. Leaves somewhat falcately lanceolate, very obtuse, 2-4x9-15 cm., cuneately petioled for 10-15 mm. Spikes more or less clustered, rather short (15-20, lengthening to 30 mm.), with about 3 slender joints rather turbinate some 18-flowered in 4+2 series: peduncle scarcely 2 mm. long: scales slightly scarious-margined. Fruit said to be yellow, subglobose, 4 mm. in diameter, smooth: sepals somewhat parted.—Plate 135.

Antillean region.—The type from Santo Domingo.

Specimens examined:—ANTILLES. SANTO DOMINGO (*Bertero*, 439 in part,—the type collection of *V. anceps*, at the National Museum of Prag, from Sprengel; also, as from Puerto Rico, under the same number, associated with *P. chrysocarpum*; *Wright*, *Parry & Brummel*, 458; *Poiteau*, from Ventenat's herbarium; *Eggers*, 1682).

PHORADENDRON HARTII (Krug & Urban).

Phoradendrum Hartii Krug & Urban, Bot. Jahrb. v. 24. p. 40. 1897.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, dioecious?. Internodes rather long (2-3x40-80 mm.),

smooth, the upper somewhat ancipitally compressed. Cataphyls mostly a single pair, nearly basal, tubular-bifid, white-margined. Leaves more or less falcately lanceolate, obtuse, 1.5-2.5x8-12 cm., cuneately narrowed below rather than petioled. Spikes mostly clustered, rather short (20 mm.), with about 4 oblong joints some 10-flowered in 4+2 series: peduncle almost suppressed: scales somewhat ciliate. Fruit ovoid, 3x4 mm., smooth: sepals closely inflexed.—Plate 136.

Caribbean region.—The type from Trinidad.

Specimens examined:—CARIBBEES. TRINIDAD (*Hart*, 6101, Aug. 1896, —the type; *Lunt*, 6117).

PHORADENDRON HAITENSE (Urban).

Phoradendrum haitense Urban, *Symbolae Antillanae*. vol. 5. p. 334. 1907.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, androgynous. Internodes short (2-3x30 mm.), smooth, ancipital and somewhat dilated upwards. Cataphyls a nearly basal pair, often with a second pair scarcely 5 mm. higher, scarcely tubular, white-margined. Leaves narrowly oblong-lanceolate, abruptly very obtuse, 1x7-10 cm., long-attenuate into the subpetiolar base. Spikes mostly solitary, moderate (25-30 mm.), with about 3 slender joints 2- to 6- or 10-flowered in 2, 4 or 4+2 series: peduncle about 3 mm. long, usually with a pair of basal scales. Fruit subglobose, 3 mm. in diameter, smooth: sepals parted.—Plate 135.

Antillean region (? exclusively) on *Swietenia*.—The type from Haiti.

Specimens examined:—ANTILLES. HAITI (*Picarda*, 1666, July 1897, —the type, 1640).

PHORADENDRON WATTII (Krug & Urban).

Phoradendrum Wattii Krug & Urban, *Bot. Jahrb.* v. 24. p. 43. 1897.

More or less pseudodichotomous, the long branches with basal cataphyls only, dioecious. Internodes moderate (2-3x30-50 mm.), minutely papillate and for a time varnished like the young foliage, somewhat compressed rather than ancipital. Cataphyls a single pair 2-3 mm. above the base, or 2 pairs the first nearly basal and the second, exceptionally fertile, some 5 mm. higher, acute. Leaves more or less falcately elliptical to broadly oblanceolate, very obtuse, 1.5-2.5x4-7 cm., cuneately subpetioled for about 5 mm. Spikes more or less clustered, about 4-jointed: short (10 mm.), with short 2-flowered joints when pistillate, and longer (30 mm.), with long 10- to 20-flowered joints when staminate: peduncle nearly suppressed: scales and deep receptacular cups ciliate. Fruit pale

yellow, ellipsoidal, 3x5 mm., somewhat wrinkled in drying: sepals truncate-inflexed.—Plates 137, 138.

Antillean region, on *Coccoloba*, *Colubrina*, *Hypelate*, *Laguncularia*, *Piscidia*, etc.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Hitchcock*, Dec. 14, 1890, —to be taken as type; *Watt*, 6221; *Campbell*, 6385, 6386, 6401; *Harris*, 6395, 6402, 6599, 6680, 6711, 9696; *Harris & Britton*, 10519; *Britton*, 355; *Marble*, 231).

A staminate specimen (*Harris*, 10188) with the spikes some 40 mm. long, with joints as much as 10 mm. long and 26-flowered, growing on other mistletoes, may be differentiated as var. *producta*.—Plate 138.

Phoradendron Helli n. sp.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes rather short (2-3x20-50 mm.), cellular-papillate or smooth, the upper compressed. Cataphyls a single pair, nearly basal, slightly tubular, white-margined. Leaves subelliptical, very obtuse, 1.5-2x3-5 cm., cuneately petioled for 5-10 mm. Spikes more or less clustered, rather short (15-25 mm.), with about 3 slender joints some 10- to 18-flowered in 4+2 series: peduncle 2-4 mm. long, sometimes with 1 or 2 lower pairs of white-margined scales. Fruit drying rusty red, ovoid, 4 mm. in diameter, somewhat cellular-papillate, when young golden-glistening like other young parts, as is general in the group: sepals nearly or quite closed.—Plate 139.

Antillean region.—The type from Puerto Rico.

Specimens examined:—ANTILLES. PUERTO RICO. East of Ponce (*Heller*, 6188, Dec. 3, 1902,—the type). Colonia S. Miguel (? *Britton & Shafer*, 1640). Yauco (*Stevens*, 5825c).

A Santo Domingan plant (*Fuertes*, 1531b) with the stem and foliage drying red, otherwise intermediate between this and the following species but with red fruit, may be known as var. *sanguinea*.—Plate 140.

Phoradendron Dussii n. comb.

Phoradendrum chrysocarpum Dussii Urban, *Symbolae Antillanae*. vol. 5. p. 333. 1907.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-3x20-40 mm.), smooth, the upper apically compressed. Cataphyls a nearly basal pair, usually followed by a second 3-8 mm. higher, tubular-bifid, white-margined. Leaves elliptical tending towards oblanceolate or obovate, very obtuse, sometimes mucronulate, 1-2 or 2.5x2-4 cm., cuneately subpetioled for some 3 mm. Spikes more or less clustered, short (15, lengthening to

20 or 25 mm.), with about 3 slender 2- to 6- or 8-flowered joints: peduncle scarcely 2 mm. long, sometimes followed by a longer sterile joint: scales white-margined. Fruit ovoid-ellipsoidal, 3x4-5 mm., smooth: sepals closely inflexed.—Plate 141.

Caribbean region.—The type from Guadeloupe.

Specimens examined:—CARIBBEES. GUADELOUPE (*Duss*, 3904 in part, —the type of *P. chrysocarpum Dussi*; also in part, 2968, 2969, 4099, 4417).

PHORADENDRON CRENULATUM (Urban).

Phoradendrum crenulatum Urban, *Symbolae Antillanae*. vol. 5. p. 332. 1907.

Pseudodichotomous or trichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-4x20-30 mm.), smooth, terete or somewhat compressed above. Cataphyls 1 or 2 nearly basal pairs, somewhat tubular, white-margined. Leaves falcately subelliptical, very obtuse, 2-2.5x4-6 cm., cuneately narrowed for about 5 mm. rather than petioled, finely crisped or brokenly crenulate. Spikes mostly solitary, rather short (20 mm.), with about 5 short joints some 10- to 14-flowered in 4+2 series: peduncle scarcely 3 mm. long, with one or more basal pairs of white-margined subciliate scales. Fruit?—Plate 140.

Antillean region (? exclusively) on *Cordia*.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Harris*, 6659, Aug. 12, 1896,—the type).

PHORADENDRON GUNDLACHII (Krug & Urban).

Phoradendrum Gundlachii Krug & Urban, *Bot. Jahrb.* vol. 24. p. 44. 1897.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, androgynous. Internodes rather short (2-3x20-30 mm.), smooth, for a time ancipital or somewhat rhombic. Cataphyls a nearly basal pair, sometimes followed by a second at some 5 mm., rather obtuse, separate. Leaves elliptical-obovate, very obtuse, 2-3x4-5 cm., somewhat abruptly wing-petioled for 5-10 mm. Spikes more or less clustered, short (15-20 mm.), with about 3 somewhat tumid joints some 6- to 10- or even 18-flowered in 4+2 series: peduncle about 3 mm. long: scales ciliate. Fruit white, ellipsoidal, about 4 mm. long, nearly smooth: sepals closely inflexed.—Plate 142.

Antillean region.—The type from Cuba.

Specimens examined:—ANTILLES. CUBA: Mt. Guajaibon (*Wright*, 2650,—the type, as of *P. flavescens* f., of Grisebach). Camaguey (*Britton*, *Britton & Cowell*, 13106). Sta. Clara (*Shafer*, 12178).

29. DOMINGENSES.

Leaves moderate and lanceolate, or spatulate and rather small, rather thin, basinerred. Shoots rhombically ancipital. Cataphyls a single pair, on the basal joint only. Pistillate flowers mostly decussately paired, as in *Dendrophthora*. Fruiting sepals not meeting. West Indies.

Leaves spatulate, blunt.

P. domingense.

Phoradendron domingense n. comb.

Loranthus domingensis Desvaux in Ham., Prodr. p. 33. 1825.

Phthirusa domingensis Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 i. 1868.

Dendropemon domingensis Van Tieghem, Bull. Soc. Bot. Fr. vol. 42. p. 170. 1895.

Phoradendrum trinervium domingense Krug & Urban, Bot. Jahrb. vol. 24. p. 38. 1897.

More or less pseudodichotomous, the moderate crowded branches with basal cataphyls only, dioecious. Internodes short (1-3x10-25 or occasionally 50 mm.), nearly smooth, rhombically ancipital or 4-angled, scarcely dilated upwards. Cataphyls a single basal pair, somewhat annular. Leaves spatulately obovate, very obtuse, 1-1.5x2.5-4.5 cm., cuneately long-attenuate rather than petioled. Spikes mostly clustered, rather short (10-15, lengthening to 30 mm.), with about 3 short slender joints decussately 2-flowered when pistillate: peduncle 3-4 mm. long, with a pair of scales at base. Fruit golden orange, ellipsoidal, 3x5 mm.: sepals erect, parted.—Plate 143.

Antillean region, on *Croton*, *Exostema*, *Forestiera*, *Pisonia*, *Randia*, etc.—The type from Hispaniola.

Specimens examined:—ANTILLES. JAMAICA (*Britton*, 807, 1895, 1927, 3068, 3795, 3905; *Britton & Hollick*, 1890; *Campbell*, 6383, 6387, 6398 in part, 6581, 6604, 6605, 6676, 6714, 6781, 7264, 8138, 9568, 10175; *Harris*, 6552, 10175).

30. RUBRAE.

Leaves small and often spatulate, rather thin, basinerred. Shoots rhombically ancipital or 4-angled. Cataphyls 1 or 2 pairs, on the basal joint only. Flowers several, mostly in 4+2 series. Fruit usually red or orange and very minutely cellular-papillate: sepals not meeting. West Indies and Mexico to northern South America.

Leaves obovate-spatulate.

West Indian.

Young fruit elongated.

Young fruit rounded.

P. trinervium.

P. rubrum.

Mexican and Central American.

Leaves subsessile.

Northern: cataphyls rather large.

P. Guazumae.

Southern: cataphyls small.

P. Rensoni.

Leaves slenderly subpetioled.

P. commutatum.

South American.

Leaves obovate: fruit subglobose.

P. sanctae-martae.

Leaves often oblanceolate: fruit ellipsoid.

P. Zuloagae.

Leaves elliptical- or oblong-lanceolate.

Sepals widely spreading. South American.

P. apertum.

Sepals moderately parted.

Mexican and Central American.

P. commutatum.

South American (fruit white?).

P. Appuni.

PHORADENDRON TRINERVIUM Grisebach.

Phoradendron trinervium Grisebach, Fl. Br. W. I. p. 314. 1860.*Viscum trinervium* Lamarek, Encl. vol. 3. p. 57. 1789.—de Candolle,

Prodromus. vol. 4. p. 280. 1830.

V. myrtilloides Willdenow, Sp. Pl. vol. 4. pt. 2. p. 739. 1806.*V. tetragonum* de Candolle, Prodromus. vol. 4. p. 282. 1830.*V. oblongifolium* de Candolle, l. c. p. 283. 1830.*V. trigonum* Dietrich, Syn. vol. 1. p. 546. 1839,—in part.*V. jamaicense* Macfadyen, Jam. vol. 2. p. 195. 1850.*Phoradendron rubrum* var. *brevispica* Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 121. 1868.*P. rubrum* var. *latifolia* Eichler, l. c. p. 121. 1868.*P. oblongifolium* Eichler, l. c. p. 134 m. 1868.*Phoradendron trinervium* Urban, Bot. Jahrb. vol. 24. p. 37. 1897.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-3x30-50 mm.), somewhat rhombically quadrangular. Cataphyls a nearly basal pair, frequently followed at a short distance by a second pair, short and rather spreading. Leaves elliptical-obovate, very obtuse, 1 or 1.5-2.5x3-5 cm., cuneately subpetioled for about 3 mm. Spikes more or less clustered, rather short (some 20 mm.), with about 3 slender joints usually some 6- or 8-flowered in 4 or 4+2 series: peduncle 1-3 or 4 mm. long. Fruit red-orange, oblong becoming subglobose, smooth, 3-4 mm. in diameter: sepals erect, parted.—Plates 144, 145, 146.

Through the West Indies.—The type from Martinique.

Specimens examined:—BAHAMAS. ACKLIN ISL. (*Brace*, 4461). GREAT RAGGED ISL. (*Wilson*, 7814, 7851). WATLING ISL. (*Wilson*, 7250, 7254, 7315). ANTILLES. JAMAICA (*McNab*, 68, 1846; *Harvey*, 1829; *March*, 1316; *Harris & Britton*, 10529). PUERTO RICO (*Bertero*; *Heller*, 6161; *Britton & Cowell*, 1293; *Britton & Shafer*, 1844; *Britton & Marble*, 2248;

Stevens & Hess, 4548, 4561; Shafer, 2003; Sintenis, 887c, 3034, 3246, 3248; Underwood & Griggs, 554; Read). ST. THOMAS (*Herb. Vent.*). CARIBBEES. ST. BARTHÉLEMY (*V. Goes*). S. EUSTATIUS (*Suringar*). SABA (*Suringar; Boldingh, 1660*). ANTIGUA (*Wulschlaegel, 256, 257*). MONTSEERAT (*Shafer, 314, 320, 600, 607*). GUADELOUPE (*Bertero, 1820*,—as *Loranthus sessilis; Perrottet, 1824*,—the type of *V. oblongifolium; Duss, 2968*). DOMINICA (*Imray; Lloyd, 463*). MARTINIQUE (*Isert, 1787*,—the type of *V. trinervium* and, as no. 18296 in the Willdenow herbarium, of *V. myrtilloides; Herb. Vent.; Duss, 102, 960, 1373, 1306*). MUSTIQUE (*Smith, 34*). TRINIDAD (*Crueger, 305; Hart, 1896*).

Phoradendron Appuni n. sp.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2.3x15-30 mm.), smooth, somewhat rhombically quadrangular. Cataphyls a single pair toward the base, short, white-margined. Leaves narrowly lanceolate, more or less mucronately obtuse to acute, scarcely 1x2.5-5.5 cm., cuneately subsessile. Spikes mostly solitary, short (15 mm.), with about 3 slender joints some 6- to 8-flowered in 4+2 series: peduncle 2 mm. long. Fruit white?, becoming subglobose, smooth, 4 mm. in diameter: sepals erect, parted.—Plate 147.

Cayenne region.—The type from Demerara.

Specimens examined:—BRITISH GUIANA (*Appun, 1783*,—the type, in the Hookerian herbarium at Kew).

Phoradendron apertum n. sp.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes rather short (2.3x25-30 mm.), smooth, acutely quadrangular. Cataphyls a single nearly basal pair, spreading. Leaves oblanceolate-elliptical, very obtuse, 1.5-2x3.5-6.5 cm., cuneately subsessile. Spikes more or less clustered, short (scarcely 15 mm.), with about 3 short little-swollen joints some 6- or 8-flowered in 4+2 series: peduncle 1-3 mm. long. Fruit reddish, subglobose, smooth, 4-5 mm. in diameter: sepals widely parted.—Plate 147.

Cayenne region.—The type from Demerara.

Specimens examined:—BRITISH GUIANA (*Jenman, 3801, Apr. 1887*,—the type).

Phoradendron Guazumae n. sp.

Pseudodichotomous or fasciculately branched, the long branches with basal cataphyls only, androgynous?. Internodes rather long (2.4x30-60 mm.), smooth, rhombically compressed becoming terete but with 4 rather persistent lines. Cataphyls a single nearly basal pair, blunt and spread-

ing, white-margined. Leaves elliptical-oblong to obovate, very obtuse, often mucronate, 1.5-2x4-5.5 cm., cuneately subpetioled for about 3 mm. Spikes often clustered, short (10, scarcely lengthening to 20 mm.), with 3 or 4 soon cylindrical joints some 6- to 8-flowered in 4+2 series: peduncle scarcely 3 mm. long, sometimes followed by a sterile joint. Fruit subglobose, smooth, 3-4 mm. in diameter: sepals somewhat parted.—Plate 148.

Sonoran region of Mexico (? exclusively) on *Guazuma*.—The type from Sinaloa.

Specimens examined:—MEXICO. SINALOA, Mazatlan (*Rose, Standley & Russell, 13846*, Apr. 1, 1910,—the type). Culiacan (*Brandeggee, 1904*).

Phoradendron sanctae-martae n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-3x25-40 mm.), smooth, rhombically quadrangular. Cataphyls a single basal pair, annular, white-margined. Leaves obovate, very obtuse or emarginate, 1x3 or 2.5-3x4-5 cm., cuneately sessile. Spikes somewhat clustered, moderate (25-35 mm.), with about 3 slender oblong joints some 10-flowered in 4+2 series: peduncle almost suppressed, often followed by a partly sterile joint. Fruit subglobose, smooth, 3 mm. in diameter: sepals somewhat parted.—Plate 149.

Venezuelan-Isthmian region.—The type from Colombia.

Specimens examined:—COLOMBIA. Santa Marta, at 250 ft. altitude (*Smith, 1284*,—the type).

Phoradendron Rensoni n. sp.

Pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes rather short (2-3x25-40 mm.), smooth, rhombically subancipital. Cataphyls a single pair, nearly basal, not tubular. Leaves obovate-oblong to obovate, very obtuse or emarginate, 1.5x3-3.5 cm., cuneately sessile. Spikes clustered, short (10-15 mm.), with about 3 plump joints subverticillately 4- to 6-flowered: peduncle scarcely 3 mm. long. Fruit subglobose, smooth, 4 mm. in diameter: sepals somewhat parted.—Plate 149.

Isthmian region.—The type from San Salvador.

Specimens examined:—EL SALVADOR. San Salvador (*Carlos Renson, 256*,—the type). COSTA RICA (*Oersted, 1, 3103*,—*P. trinervium*, Oliver).

Phoradendron Zuloagae n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes moderate (2-3 or 5x30-50 or

70 mm.), resinous-dotted, acutely quadrangular, somewhat rhombically compressed above. Cataphyls a nearly basal pair, annular. Leaves oblanceolate to obovate-spatulate, mucronately obtuse, 1-1.5x3-5 cm., cuneately subsessile. Spikes more or less clustered, moderate (15-25 mm.), with about 3 somewhat clavate or fusiform rather short joints some 10-flowered in 4+2 series: peduncle 1-2 mm. long. Fruit yellow, ellipsoid, nearly smooth, about 3x4 mm.; sepals erect, parted.—Plates 9, 150.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Caracas (Zuloaga, 1915,—the type).

In the region of *P. venezuelense*, which it resembles closely but from which it differs in its more spatulate leaves and especially in its ellipsoid fruit with parted sepals.

***Phoradendron commutatum* n. sp.**

Phoradendron quadrangulare and *P. rubrum* of most writers, as to continental North America.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-40 mm.), resinous-dotted, acutely quadrangular. Cataphyls a nearly basal pair, sometimes with a second pair at a distance of about 5 mm. Leaves oblanceolate-oblong or obovate, mucronately obtuse to acute, .5-1x3.5-4 cm., or as much as 2x5 cm., cuneately sessile. Spikes mostly solitary, moderate (15, becoming 30 mm.), with 3 or 4 slender somewhat fusiform elongated joints some 6-flowered in 4+2 series: peduncle about 4 mm. long, often followed by an elongated sterile joint. Fruit red, globose, microscopically cellular-papillate, 3 mm. in diameter: sepals inflexed but not meeting.—Plates 150, 151.

Mountains of Mexico and Central America.—The type from western Mexico.

Specimens examined:—MEXICO. Guadalajara to Tepic (Gregg, 903, 1849,—the type). Acaponeta, Tepic (Rose, Standley & Russell, 14450). Concepcion, Sinaloa (Rose, 1525). San Luis Potosi (Purpus, 5322). Mirador (Liebmann, 2, 3098-9,—*P. rubrum* Oliver, Vidensk. Meddel. Kjöbenhavn. 1864, like the following). Consoquitla (Liebmann, 2, 3100). Orizaba (Mueller, 556, 1001; Sallé, 67). Vera Cruz (? Greemman, 120). Lagunas (Nelson, 2650). Without locality (Sumichrast, 341). HONDURAS. Puerto Cortez (? Kellerman, 4720). NICARAGUA. Without locality (Wright, 1853-6,—on the Ringgold and Rodgers Expedition).

PHORADENDRON RUBRUM Grisebach.

Phoradendron rubrum Grisebach, Fl. Br. W. I. p. 314. 1860,—as to name only.

Viscum rubrum Linnaeus, Sp. Plant. p. 1025. 1753.—de Candolle, Prodr. vol. 4. p. 281.

P. tetrastachyum spathulifolium Grisebach, Cat. Pl. Cub. p. 120. 1866.

P. tetrastichus Hitchcock, Rept. Mo. Bot. Gard. vol. 4. p. 125. 1893,—for *tetrastachyum*.

Phoradendrum spathulifolium Krug & Urban, Bot. Jahrb. vol. 24. p. 41. 1897.

At most somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes short (2-3x20 mm.), smooth, rhombically ancipital and somewhat dilated upwards. Cataphyls a nearly basal pair, frequently followed by 1 or 2 others at short intervals, blunt and spreading. Leaves somewhat rhombically lance-spatulate to obovate, obtuse, 1-1.5x4 cm., cuneately tapered and subpetioled for 5 mm. Spikes more or less clustered, short (scarcely 20 mm.), with 2 or 3 oblong joints about 12-flowered in 4+2 series: peduncle 2-3 mm. long. Fruit red or exceptionally yellow, subglobose, smooth, 4 mm. in diameter: sepals more or less erect and parted.—Plates 152, 153.

Antillean and Bahamian regions.—The type from the Bahamas.

Specimens examined:—BAHAMAS. Without locality (*Catesby*, in the herbarium of the South Kensington Museum,—the prototype of *V. rubrum*). ABACO (*Coker*, 558). FORTUNE ISL. (*Eggers*, 3847). CROOKED ISL. (*Hitchcock*, 1890; *Brace*, 4643). LONG ISL. (*Britton & Millspaugh*, 6325). CAT ISL. (*Britton & Millspaugh*, 5867). MARIGUANA (*Wilson*, 7449, 7457, 7532, 7579). NEW PROVIDENCE (*Brace*, 3428; *Britton & Brace*, 832; *Coker*, 303). ACKLIN ISL. (*Brace*, 4461). WATLING'S ISL. (*Wilson*, 7254). INAGUA (*Nash & Taylor*, 947, 1021, 1314 and 1342—with yellow fruit). ANTILLES. CUBA (*Wright*, 512, 1200b, 1300b,—the type of *P. tetrastachyum spathulifolium* and of *P. spathulifolium*; *Combs*, 347, 348; *Shafer*, 296, 371).

Linnaeus apparently based *Viscum rubrum* on the description and illustration of the plant figured on pl. 81 of *Catesby's* celebrated work on the Bahamas, the true character of which is evident from the accompanying photographic illustration of one of the several specimens of *Catesby's* collection preserved at South Kensington. Grisebach, who intended to transfer into *Phoradendron* the species which Linnaeus had called *Viscum rubrum*, and who therefore stands as the author of the name as here used, really applied it to the plant here called *P. antillarum*, and he subsequently rechristened the true *rubrum* *P. tetrastachyum spathulifolium*.

31. QUADRANGULARES.

Leaves rather small, prevailingly elongated, thin, basinerved. Shoots for a time sharply 4-sided or 4-lined. Cataphyls usually a single pair, on the basal joint only. Flowers several, usually in 4 or 4+2 series. Fruit mostly red or orange and minutely cellular-papillate: sepals closely inflexed and meeting. Central and South America and the West Indies.

Fruit white: leaves elliptical-oblong to obovate. Andean.

Leaves cuneately subsessile.

P. quadrangulare.

Leaves abruptly petioled.

P. viscifolium.

Fruit red or orange.

Brazilian.

Leaves subsessile.

Young fruit elongated.

P. Wiesnerianum.

Young fruit rounded.

Leaves oblanceolate-spatulate.

P. affine.

Leaves obovate-spatulate.

P. Martianum.

Leaves slenderly subpetioled.

Elliptical-obovate.

P. piauhyanum.

Linear-oblanceolate.

P. microphyllum.

Venezuelan.

P. venezuelense.

Central American.

Leaves lance-oblong.

P. ceibanum.

Leaves elliptical-obovate.

P. zacapanum.

Mexican.

Leaves elliptical-obovate.

Spikes stalked. Continental.

P. tamaulipense.

Spikes subsessile. Yucatecan.

P. Gaumeri.

Leaves oblanceolate-oblong. Insular.

P. Townsendi.

West Indian.

Leaves lanceolate or oblanceolate-obovate.

P. antillarum.

Leaves linear-oblanceolate.

P. gracile.

PHORADENDRON QUADRANGULARE (Krug & Urban).

Phoradendron quadrangulare Krug & Urban, Bot. Jahrb. vol. 24. p. 35. 1898.

Loranthus quadrangularis Humboldt, Bonpland & Kunth, Nov. Gen. Sp. vol. 3. p. 444. 1818.

Viscum quadrangulare de Candolle, Prodrum. vol. 4. p. 283. 1830.

Viscum salicifolium Presl, Epimel. Bot. p. 254. 1849.

Phoradendron salicifolium Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 110. 1868.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-50 mm.), resinous-dotted or somewhat cellular-papillate, rhombically quadrangu-

lar or 4-winged. Cataphyls a single pair toward the base, spreading. Leaves narrowly obovate to elliptical-oblong, more or less mucronately very obtuse, 1-1.5x3.5-5 or 6 cm., cuneately subpetioled for scarcely 3 mm. Spikes more or less clustered, moderate (30-40 mm.), with 3-5 slender elongated joints rather turbinate some 12- to even 26-flowered in 4 or 4+2 series: peduncle 2-3 or rarely 5 mm. long, sometimes followed by a sterile joint. Fruit white, subglobose, cellular-papillate, 3 mm. in diameter: sepals closely inflexed.—Plates 154, 155.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA, (Bonpland, 1795 on *Guazuma*,—the type of *L. quadrangularis*). Without locality (Holton, 656). ECUADOR. Quito (*Haenke*,—the type of *V. salicifolium*). Guayaz (*Sodi*, Aug. 23, 1872). Bodega (*Sodi*, Sept. 3, 1872). Hacienda El Recreo, Manabi (*Eggers*, 14829).

As in the case of *P. rubrum*, the authors of the binomial here used had in mind a different species from the one to which it is now applied, but their intention to transfer *Loranthus quadrangularis* HBK. into *Phoradendron* is unmistakable. The Colombian type differs from the Ecuadoran *salicifolium* in having more rhombic internodes.

PHORADENDRON VISCIFOLIUM n. comb.

Loranthus viscifolius Humboldt, Bonpland & Kunth, Nov. Gen. Sp. vol. 3. p. 443. 1818.

Viscum Kunthianum de Candolle, Prodr. vol. 4. p. 283. 1830.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes rather short (2-3x30-50 mm.), nearly smooth, acutely quadrangular. Cataphyls a single nearly basal pair. Leaves obliquely obovate, obtuse, 1.5-2x3.5-5 cm., rather abruptly subpetioled for over 5 mm. Spikes more or less clustered, moderate (30 mm.), with about 3 slender elongated joints some 8-flowered in 4 or 4+2 series: peduncle about 2 mm. long. Fruit subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 155.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. Guayaquil (Bonpland, 3798,—the type).

Phoradendron Wiesnerianum n. sp.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-50 mm.), smooth, rhombically quadrangular or 4-winged. Cataphyls a single pair toward the base, blunt and spreading. Leaves subspatulately elliptical, mucronately very obtuse, 1-1.5x4-5 cm., cuneately subsessile. Spikes

mostly clustered, short (10, becoming 20 mm.), with 2 or 3 slender elongated joints some 12-flowered in 4+2 series: peduncle 1-3 mm. long, often followed by a partly sterile joint. Fruit ovoid, cellular-papillate, 3x4 mm.: sepals closely inflexed.—Plate 156.

Brazilian region.—The type from Ceara.

Specimens examined:—BRAZIL. Ceara (*Gardner*, 1673, 1674—the type).

Phoradendron piauhyanum n. nom.

Phoradendron rubrum var. *longispica* Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 121. 1868.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-50 mm.), smooth, more or less rhombically quadrangular. Cataphyls a nearly basal pair, sometimes followed by a second pair some 5 mm. higher. Leaves elliptical-spatulate, very obtuse or subemarginate, 1.5-2x4-6 or 8 cm., cuneately subpetioled for scarcely 5 mm. Spikes mostly clustered, long for the group (25, becoming 40-50 or 60 mm.), with 3-6 slender elongated joints turbinate some 20-flowered in 4+2 series: peduncle almost suppressed, sometimes followed by an elongated sterile joint. Fruit round-ovoid, smooth, 3 mm. in diameter; sepals closely inflexed.—Plate 157.

Brazilian region.—The type from Piahy.

Specimens examined:—BRAZIL. Piahy (*Gardner*, 2617,—the type of *P. rubrum* var. *longispica*, 2623). Panuri (*Spruce*, 2909). Santarem (*Spruce*, 4, 739).

Phoradendron ceibanum n. sp.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes rather short (2-4x30 mm.), smooth, rhombically 4-angled, somewhat dilated and apical upwards. Cataphyls a single nearly basal pair. Leaves oblong-elliptical, mucronately subacute to obtuse, 1.5-2 or 2.5x4-7 cm., petioled for about 5 mm. Spikes mostly solitary, moderate (40-50 mm. in fruit), with about 3 rather slender oblong joints some 20-flowered in 4 or 4+2 series: peduncle 2-3 mm. long. Fruit subglobose, minutely cellular-papillate, 4 mm. in diameter: sepals closely inflexed.—Plate 158.

Isthmian region.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Rio Ceiba, Buenos Aires (*Pittier* [or *Tonduz*?] 3900, 1891,—the type, 6638). Ojo de Agua (*Hoffmann*, 378, 1856). NICARAGUA. Mosquito Coast (*Wulfschlaegel*). Granada (*Lévy*, 1293). Realejo (*Baker*, 2096).

Phoradendron venezuelense n. sp.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-3x20-30 mm. or 5x60 mm.), smooth, rhombically 4-angled, somewhat compressed. Cataphyls a single nearly basal pair, annular-parted. Leaves oblong-lanceolate, mucronately obtuse to subacute, .3-1x3-4 cm., cuneately subpetioled for about 3 mm. Spikes often clustered, short (15 mm.), with about 3 slender short joints some 12- to 18-flowered in 4+2 series: peduncle nearly suppressed. Fruit greenish yellow to red, subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 159.

Venezuelan and Isthmian regions.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1810,—the type, ?1117). Valencia (*Moritz*, 307). Oritrico (*Otto*, 556). Caracas (*Gollmer*, 1854; *Knoop*, iii). COLOMBIA. Sta. Marta (?*Smith*, 1280). PANAMA. Aspinwall (*Hayes*, 829). Paraiso (?*Hayes*, 323). Chagres (?*Fendler*, 1341). Gamboa (*Pittier*, 2604). CARIBBEES. TRINIDAD (*Fendler*, 651; *Hart*, 6116).

Phoradendron antillarum n. sp.

Phoradendron rubrum and *P. quadrangulare* of most writers, as to the

West Indies except the Bahamas and some few Cuban collections.

Viscum angustifolium Bertero in Sprengel, Syst. vol. 1. p. 487. 1825.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes moderate (2-3x15-40 or 50 mm.), somewhat cellular-papillate, acutely quadrangular, somewhat rhombically dilated above. Cataphyls a single nearly basal pair, annular, white-margined. Leaves lanceolate, mucronately subacute, typically narrow .5-1x3-4 cm., cuneately subsessile. Spikes more or less clustered, rather short (15-20, lengthening to 30 mm.), with about 3 slender subfusiform joints about 14-flowered in 4+2 series: peduncle about 1 mm. long. Fruit red varying into yellow or white, subglobose, smooth, 3-4 mm. in diameter: sepals closely inflexed.—Plate 160.

Antillean and upper Caribbean regions.—The type from Cuba.

Specimens examined:—ANTILLES. CUBA (*Wright*, 452, 1302,—the type; *Poeppig*, 1824; *Pareyss*, 1839; *Herb. Le Jolis.*, 871; *de la Sagra*; *Eggers*, 4782; *Combs*, 299; *Van Hermann*, 1448; *Shafer*, 159, 296, 363, 371, 563, 815, 1109, 1622, 11823—noted as having white fruit, 11828—with yellow fruit, 12109, 12403; *Pringle*, 80; *Baker*, 2559; *Wilson*, 1748; *Rugel*, 269b; *Britton*, 165, 1950, 1985, 2052, 2119; *Britton*, *Britton & Cowell*, 10241; *Britton & Cowell*, 12553; *Britton & Wilson*, 4886, 5644; *Britton*, *Earle & Wilson*, 4585, 4687; *Britton*, *Britton & Wilson* 5579). HAITI (*Prax*, 1854; *Ehrenberg*, 13; *Eggers*, 3328; *Picarda*, 72, 132b, 301,

448; Nash & Taylor, 1322). SANTO DOMINGO (Bertero; Ehrenberg; Wright, Parry & Brummel, 467; Eggers, 1651, 1983; Fuertes, 383, 827; v. Tuerckheim, 2616; Taylor, 223, 338, 481, 497; Emanuel, 1). JAMAICA (Hitchcock, 1890; Hansen, 1310; Britton, 2840, 3668; Shafer, 159, 296, 363, 563, 815, 1109, 1622; Harris, 6577, 6584, 6927—bearing *Cuscuta*; Brown, 394; Maxon, 1675). PUERTO RICO (Bertero, 8, 1234—the type collection of *Viscum angustifolium* Bertero; Eggers, 965; Cowell, 753; Stahl, 45, 1043; Heller, 205, 6186; Sintenis, 885, 887b, 3035, 3292b, 3912, 5562, 6624, 7601; Garber, 24; Krug, 538; Schwancke; Kuntze, 495; Underwood & Griggs, 211; Britton & Marble, 2245—with yellow fruit; Britton & Shafer, 1644; Stevens, 5212, 5825b, 5826-9, 5907, 5908, 5935; Stevens & Hess, 4563, 4988; Hess, 5402; Brother Hioram, 1912). CARIBBEES. ANTIGUA (Nicholson, 16). GUADELOUPE (Sprengel). DOMINICA (Eggers, 93).

With stouter (2.4x30-60 mm.), smooth, acutely quadrangular, but little dilated internodes, and larger elliptical-lanceolate leaves 1.2x5-9 cm., mostly 5-nerved and somewhat veiny, and spike-joints about 18-flowered, it is var. *orientalis* (Pl. 161). Eastern Cuba (Britton, 1985, 2119—the type; Britton, Cowell & Shafer, 12919, and, in an equally long- but rather narrower-leaved form, f. *longa*, Pl. 161, Britton, 2415). Puerto Rico (Underwood & Griggs, 383).

Phoradendron Townsendi n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2.3x15-35 mm.), cellular-papillate, somewhat rhombically quadrangular. Cataphyls a single nearly basal pair, annular-bifid, white-margined. Leaves oblanceolate-oblong or subspatulate, mucronate but very obtuse, 1.2x4-6 cm., cuneately narrowed rather than petioled. Spikes more or less clustered, short (10 mm.), with about 3 short joints scarcely 6-flowered in 2, 4 or 4+2 series: peduncle scarcely 1 mm. long. Fruit?—Plate 162.

Western insular region of Mexico.—The type from Socorro.

Specimens examined:—MEXICO. Socorro, Revillagigedo Islands (*Anthony*, 1897; *Townsend*, Mar. 1899; *Barkewell*, 177, 1903,—the type).

Phoradendron gracile n. comb.

Phoradendrum quadrangulare gracile Krug & Urban, Bot. Jahrb. vol. 24. p. 37. 1897.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (1.2x25-30 mm.), smooth, acutely quadrangular. Cataphyls a single pair, nearly basal, annular-bifid, white-

margined. Leaves subspatulately oblanceolate-oblong, subacute to very obtuse or slightly emarginate, .5-1x3-5 cm., attenuately subsessile. Spikes mostly solitary, short (10, lengthening to 20 mm.), with about 3 short slender but somewhat fusiform joints about 10-flowered in 4+2 series: peduncle 1-2 mm. long. Fruit subellipsoid, sparingly but evidently low-warty, 3 mm. in diameter: sepals inflexed and closely meeting or slightly parted.—Plate 163.

Antillean region.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA (*Harris*, 6392, 1896,—taken as the type, 6384, 6400, 6544, 6585, 6661; *Hansen*, 1897; *Campbell*, 6384, 6400, 1896; *Britton*, 2991, 3283, 3668).

A Jamaican specimen (*Ball*, 1882), with staminate spikes 30-35 mm. long, their half-dozen joints somewhat turbinate about 20-flowered, may be known as var. *Ballii*.—Plate 163.

Phoradendron microphyllum n. comb.

Viscum microphyllum Pohl in de Candolle, Prodrum. vol. 4. p. 283. 1830.

Phoradendron rubrum var. *microphylla* Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 120. 1868.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (1-2x20-40 mm.), smooth, rather rhombically 4-sided becoming terete. Cataphyls a single pair, nearly basal or as much as 5 mm. above the base, short and spreading. Leaves oblanceolate-spatulate, mucronately rather obtuse, .3-.7x2.5-4 cm., slenderly attenuate at base. Spikes solitary, short (scarcely 10, lengthening to 30 mm.), with about 3 slender joints scarcely 10-flowered in 4+2 series: peduncle 2-5 mm. long. Fruit rather ellipsoid, smooth, 3x4 mm.: sepals closely inflexed.—Plate 164.

Brazilian region.—The type from Tingua.

Specimens examined:—BRAZIL. Tingua (*Pohl*, 245, 4583—the type of *V. microphyllum*). Rio de Janeiro (*Glaziou*, 2598, 8728). Alagoas (*Gardner*, 1324, 1325,—from which the fruit is described).

PHORADENDRON AFFINE Nuttall.

Phoradendron affine Nuttall, Journ. Philad. Acad. n. s. vol. 1. p. 185. 1847.

Viscum affine Pohl in de Candolle, Prodrum. vol. 4. p. 281. 1830.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes moderate (2x30-50 mm.), smooth, acutely quadrangular above. Cataphyls a single pair toward the base,

blunt and spreading, white-margined. Leaves oblanceolate-spatulate, very obtuse, .5-1x2-4 cm., cuneately subsessile. Spikes more or less clustered, moderate (20-30 mm.), with about 3 elongated slender joints 6- to 10-flowered in 4+2 series: peduncle 5 mm. long. Fruit orange-red, globose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 165.

Brazilian region.—The type from S. João Baptista.

Specimens examined:—BRAZIL. S. João Baptista (*Pohl*, 544, 1828,—the type of *V. affine*). Minas Geraes (*v. Martius*). Lagoa Santa (*Warming*). Ilha Marajo, Pará (*Huber*, 469). Mattogrosso (*Kuntze*; *Moore*, 954). Barrhina, Bahia (*Rose & Russell*, 19799).

Phoradendron Martianum n. sp.

Phoradendron rubrum Eichler in *v. Martius*, Fl. Brasil. vol. 5. pt. 2. p. 120, as to the plant depicted on pl. 38. f. 2. 1868.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2.5x20-50 mm.), smooth, acutely quadrangular. Cataphyls a single pair toward the base, blunt, white-margined. Leaves shortly elliptical or somewhat obovate, very obtuse, 1.5-2x3.5-4 cm., cuneately subsessile. Spikes mostly solitary, moderate (15, becoming 35 mm.), with about 3 oblong joints some 10- to 18-flowered in 4+2 series: peduncle 3-5 mm. long. Fruit red, subglobose, essentially smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 166.

Brazilian region.—The type from Alagoas.

Specimens examined:—BRAZIL. Alagoas (*Gardner*, 1321—the type, 1323). Piahy (*Gardner*, 2619). Ceara (*Gardner*, 1673, 1674). Rio de Janeiro (*Gaudichaud*, 567, 1833; *Glaziov*, 2598, 8728, 14887 in part; *Schenck*, 3902). Without locality (? *Gardner*, 1028; *Guillemin*, 185; *Weddell*, 1594, 1858).

Phoradendron Gaumeri n. sp.

Pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x20-50 mm.), smooth, acutely quadrangular. Cataphyls a single nearly basal pair, blunt, white-margined. Leaves subelliptical-obovate, more or less mucronately obtuse, about 1x2.5-3 cm., cuneately subsessile. Spikes mostly clustered, moderate (20-30 or even 40 mm.), with about 3 elongated joints some 12- to 18-flowered in mostly 4+2 series: peduncle 1-2 mm. long. Fruit?—Plate 167.

Yucatecan region.—The type from Yucatan.

Specimens examined:—MEXICO. Izamal, Yucatan (*Gaumer*, 561, 1895, in part,—the type).

Phoradendron tamaulipense n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes moderate (2.5x30-50 mm.), smooth, acutely quadrangular, somewhat ancipitally compressed above. Cataphyls a single basal pair, annular. Leaves elliptical-obovate, more or less mucronately obtuse, 1-2x3.5-5 cm., cuneately subsessile. Spikes mostly solitary, at length rather long (15-20, becoming 50 mm.), with 3-5 elongated joints some 6- to 12-flowered in 4 or 4+2 series: peduncle 3-10 mm. long, when short usually followed by a partly floriferous joint. Fruit red, globose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 167.

Eastern Sierra Madre and Cordillera of Mexico.—The type from Alvarado.

Specimens examined:—MEXICO. Victoria (*Palmer*, 21, 1907). Tampico (*Palmer*, 81, 221). Alvarado (*Seler*, 422, 4484—the type). Orizaba (*Mueller*, 1570). Zacuapam (*Purpus*, 6280). Fortin (*Kerber*, 1990). Without locality (? *Karwinski*, 1844). Caxamatle (*Wawra*, 567). Jayacatlan, Oaxaca (? *Smith*, 360).

Phoradendron zacapanum n. sp.

More or less pseudodichotomous or verticillately branched, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (3x30-60 mm.), acutely 4-angled. Cataphyls a single basal pair, annular, white-margined. Leaves obovate to oblanceolate-oblong, very obtuse or somewhat emarginate, 2-3.5x5-7.5 cm., cuneately subsessile. Spikes mostly solitary, moderate (20-30 or 40 mm.), with about 4 elongated rather fusiform joints some 10- to 18-flowered in 4+2 series: peduncle 3-5 mm. long. Fruit (immature) subglobose, smooth: sepals closely inflexed.—Plate 168.

Guatemalan region.—The type from Gualan.

Specimens examined:—GUATEMALA. Gualan, Zacapa (*Kellerman*, 5604, Dec. 30, 1906, 5612—the type, 5728, 5972). Without locality (? *Friedrichsthal*, 1625).

32. EMARGINATAE.

Leaves broad or small, usually rather papery, basinerved, but mostly with prominent midrib beneath. Shoots ancipital or acutely quadrate, mostly papillate. Cataphyls a single pair, on the basal joint only. Flowers in 2, 4 or 4+2 series. Fruit warty, the sepals usually parted. South America: one species in Yucatan and one in the West Indies.

Spikes 3- or more jointed: leaves mostly drying papery.

Shoots 4-winged: fruit large (4 mm.).

P. Lyoni.

Shoots rhombically ancipital or 4-lined.

Leaves obovate.

Rather large (fully 2x3 cm.), and firm, emarginate.

P. emarginatum.

Smaller (scarcely 1.5x2.5 cm.).

Blunt or emarginate.

P. minor.

Often mucronate.

Shoots little dilated.

Leaves very small (under 1 cm.).

P. obovatifolium.

Leaves larger.

Suborbicular.

P. mucronatum.

Cuneate-obovate.

P. yucatanum.

Shoots much flattened.

P. Ottonis.

Leaves oblanceolate-obovate.

P. Degenianum.

Spikes 1- or 2-jointed.

Leaves long-cuneate.

P. cuneifolium.

Leaves obovate or elliptical.

Rather papery: shoots slender.

P. cearense.

Rather fleshy: shoots stout.

P. caracasenum.

Phoradendron Lyoni n. sp.

Divaricately pseudodichotomous, the long stout branches with basal cataphyls only, androgynous?. Internodes moderate (3-4x20-50 mm.), papillately roughened, acutely quadrangular or winged. Cataphyls a single pair, nearly basal, bifid. Leaves elliptical-obovate, very obtuse to subacute or mucronate, 1.5-2.5x3-5 cm., cuneately wide-based for about 5 mm. Spikes mostly solitary, short (in fruit 15-20 mm.), with about 4 short 2- to 4-flowered joints: peduncle suppressed: scales ovate, ciliate. Fruit red, globose, 4 mm. in diameter, verrucose: sepals suberect. —Plate 169.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. San Julian (*M. W. Lyon, Jr.*, July 18, 1900,—the type in the U. S. National Herbarium; *Robinson & Lyon*, July 18, 1900). Las Trincheras (*Warming*, 1891-2).

PHORADENDRON EMARGINATUM Eichler.

Phoradendron emarginatum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 118. pl. 38. 1868.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-3x30-50 mm.). papillately roughened, acutely 4-angled. Cataphyls a single nearly basal

pair or a second pair exceptionally present, bifid. Leaves obovate, more or less mucronately emarginate, 2-3x3-5 cm., cuneately subpetioled for about 5 mm. Spikes mostly clustered, moderate, (30 mm. in fruit), with 4 or 5 joints 4- or 6-flowered in 4 or 4+2 series: peduncle scarcely 2 mm. long: scales ciliate. Fruit ovoid, 3x4 mm., verrucose: sepals suberect.—Plate 170.

Brazilian region.—The type from Minas Geraes.

Specimens examined:—BRAZIL. Minas Geraes (*Claussen*, 252, 1839, —taken as type). Piahy (*v. Martius*). Without locality (*Claussen*, 113). Rio de Janeiro (*Glaziou*, 9861, 14887). Ceara (*Gardner*, 1670-1). Joazeiro, Bahia (*Rose & Russell*, 19751). BOLIVIA. Velasco (*Kuntze*, 19). Sierra de Sta. Cruz (*Kuntze*, 18).

Phoradendron minor n. comb.

Phoradendron emarginatum minor Eichler in *v. Martius*, Fl. Brasil. vol. 5. pt. 2. p. 119. 1868.

More or less pseudodichotomous, the short branches with basal cataphyls only, androgynous?. Internodes short (2x10-25 mm.), nearly smooth, slightly 4-winged. Cataphyls a single pair, basal, deeply notched. Leaves ovate or suborbicular, mucronately very obtuse or mostly emarginate, 1-1.5x1.5-2.5 cm., rather abruptly subpetioled for 2 mm. Spikes short, with about 4 subglobose joints subverticillately about 4-flowered: peduncle very short: scales ciliate. Fruit?—Plate 172.

Brazilian region.—The type from Piahy.

Specimens examined:—BRAZIL. Piahy (*v. Martius*,—the type of *P. emarginatum minor*).

PHORADENDRON OBOVATIFOLIUM Morong.

Phoradendron obovatifolium Morong, Ann. N. Y. Acad. Sci. vol. 7. p. 216. 1892.

Pseudodichotomous, the rather short and slender branches with basal cataphyls only, androgynous. Internodes short (1-2x10-20 mm.), nearly smooth, acutely 4-angled, slightly flattened upwards. Cataphyls a single pair, nearly basal, notched. Leaves obovate, mucronately very obtuse or emarginate, .5-2x1-2.5 cm., rather abruptly subpetioled for 3 mm. Spikes solitary, short (8-15 mm.), with about 4 slender joints subverticillately 4- to 6-flowered above the middle: peduncle 1 mm. long: scales ciliate. Fruit ovoid, 2 mm. long, verrucose: sepals suberect.—Plate 171.

Brazilian region (? exclusively) on *Piptadenia*.—The type from Paraguay.

Specimens examined:—PARAGUAY. Gran Chaco, opposite Asuncion (*Morong*, 1582,—the type). Rio Pilcomayo (*Hassler*, 298). Rio Apa to Rio Aquidaban (*Fiebrig*, 32, 4981).

PHORADENDRON MUCRONATUM (Krug & Urban).

Phoradendrum mucronatum Krug & Urban, Bot. Jahrb. vol. 24. p. 34. 1897.

Viscum mucronatum de Candolle, Prodröm. vol. 4. p. 282. 1830.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes short (2x10-20 mm.), papilately roughened, acutely 4-angled, slightly flattened upwards. Cataphyls a single pair, nearly basal, notched. Leaves suborbicular or obovate, more or less mucronately very obtuse or emarginate, 1-2x1.5-3 cm., rather abruptly petioled for 1-2 mm. Spikes more or less clustered, short (5-10 mm.), with about 3 short 4- to 6-flowered joints: peduncle very short: scales ciliate. Fruit round-ovoid, 3-4 mm. long, verrucose: sepals erect.—Plate 172.

Antillean and Caribbean regions, on *Croton*, *Psidium*, etc.—The type from Santo Domingo.

Specimens examined:—ANTILLES. SANTO DOMINGO (*Bertero*,—the type of *V. mucronatum*; *Varamel*, 1851; *Fuertes*, 240, 1175, 1393). HAITI (*Buch*, 319; *Nash*, 98). JAMAICA (? *Purdie*,—with sessile ovate obtuse leaves 4x6 cm.). CARIBBEES. GUADELOUPE (*Duss*, 4156). MARTINIQUE (*Duss*, 100; *Hahn*, 296, 1383, 1385).

Phoradendron yucatanum n. sp.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous?. Internodes short (2x10-30 mm.), somewhat velvety-papillate, ancipital or somewhat quadrately angled, slightly widened upwards. Cataphyls a single pair, nearly basal, bifid. Leaves cuneately obovate to suborbicular, mucronately very obtuse to emarginate, 1-1.5x1.5-2.5 cm., scarcely petioled. Spikes solitary, short, (5-10 mm.), with about 3 subglobose verticillately 4-flowered joints: peduncle 1 mm. long: scales ciliate. Fruit (immature) subglobose, scarcely 2 mm. in diameter, verrucose: sepals erect.—Plate 173.

Yucatecan region.—The type from Yucatan.

Specimens examined:—MEXICO. Yucatan, without other data (*Gau-mer*, 561 in part, 1895,—the type, in the herbarium of the Field Museum).

PHORADENDRON OTTONIS Eichler.

Phoradendron Ottonis Eichler in v. Martius, Fl. Brasil. v. 5. pt. 2. p. 119. 1868.

Pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes short (2x15-25 mm.), nearly smooth, little quadrate, ancipitally dilated to a width of 5-7 mm. below the nodes.

Cataphyls a single pair, basal, tubular-bifid. Leaves round-obovate, mucronately obtuse to subacute, 1-1.5x1.5-2 cm., cuneately subpetioled for 1-2 mm. Spikes solitary, short (10-15 mm.), with about 3 short 4-flowered joints: peduncle 1-2 mm. long: scales scarcely ciliate. Fruit (immature) subglobose, 2 mm. in diameter, verrucose: sepals nearly or quite meeting.—Plate 173.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Orituco (*Otto*, 565, Feb. 22, 1840, —the type). Cumana (*Funcko*, 295; *Herb. Le Jolis.*, 1870). Locality? (*Eggers*, 13335).

Phoradendron Degenianum n. sp.

More or less pseudodichotomous or verticillate, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2x 20-40 mm.), papillately roughened, acutely quadrangular, somewhat compressed upwards. Cataphyls a single pair, nearly basal, deeply notched. Leaves oblanceolate-obovate, mucronately subacute to very obtuse or emarginate, 1.5-2x3-4.5 cm., cuneately slender-petioled for 5-10 mm. Spikes solitary, short (10, lengthening to 15 or 20 mm.), with 3-5 rather slender joints clavately some 4-flowered about the middle: peduncle 1-2 mm. long: scales ciliolate. Fruit subglobose, 3 mm. in diameter, verrucose: sepals ascending, scarcely meeting.—Plate 174.

Venezuelan-Isthmian region.—The type from Colombia.

Specimens examined:—COLOMBIA. Sta. Marta (*H. H. Smith*, 1282, 1285—the type).

PHORADENDRON CUNEIFOLIUM (Urban).

Phoradendrum cuneifolium Urban, Bot. Jahrb. v. 23. Beibl. 57. p. 5. 1897.

More or less pseudodichotomous, the slender branches with basal cataphyls only, androgynous. Internodes short (1-2x10-20 mm.), papillately roughened, rhombically quadrangular. Cataphyls a single pair, nearly basal, bifid. Leaves inversely triangular, more or less mucronately very obtuse to truncate or emarginate, 1-1.5x2-4 cm., gradually cuneate to the slender base rather than petioled. Spikes mostly solitary, very short (scarcely 5 mm.), with a single fertile 6-flowered joint: peduncle almost suppressed. Fruit subglobose, 3-4 mm. in diameter, sparingly low-verrucose: sepals erect.—Plate 174.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1115,—the type).

PHORADENDRON CEARENSE Eichler.

Phoradendron cearense Eichler in v. Martius, Fl. Brasil. v. 5. pt. 2. p. 118. 1868.

Pseudodichotomous, the slender branches with basal cataphyls only, androgynous. Internodes moderate (1-3x30-40 mm.), somewhat papillately roughened, acutely 4-angled, the upper rhombic. Cataphyls a single pair, nearly basal, bifid. Leaves elliptical-obovate, more or less mucronately obtuse or emarginate, 2-3x5-7 cm., cuneately subpetioled for scarcely 5 mm. Spikes often clustered, very short (5-10 mm.), with about 2 joints 4- to 6-flowered: peduncle 1-2 mm. long: scales ciliate. Fruit ovoid, 3 mm. long, somewhat verrucose: sepals scarcely meeting.—Plate 176.

Brazilian region.—The type from Ceara.

Specimens examined:—BRAZIL. Ceara (*Gardner, 1675*,—the type).

With shorter internodes (10-20 mm. long), and rather thick more often obovate and emarginate leaves, it is var. *minor* Eichler, *l. c.*, from the same region. (*Gardner, 1669*).—Plate 175.

PHORADENDRON CARACASANUM (Urban).

Phoradendrum caracasenum Urban, Bot. Jahrb. v. 23. Beibl. 57. p. 4. 1897.

Divaricately branched and pseudodichotomous, the rather stout branches with basal cataphyls only, androgynous?. Internodes rather short (2-3x15-40 mm.), very minutely papillate, rhombically ancipital or acutely 4-angled or 4-winged. Cataphyls a single pair, nearly basal, bifid. Leaves obovate, very obtuse, 1.5-2.5x3-3.5 cm., cuneately subpetioled for about 5 mm., fleshy for the group and scarcely veined. Spikes solitary, very short (5 mm.), with a single 4- or 6-flowered joint: peduncle nearly suppressed. Fruit globose, 5 mm. in diameter, verrucose: sepals inflexed.—Plate 176.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Between Macqueria and Caracas (*Gollmer, Feb. 2, 1855*,—the type).

33. ARGENTINAE.

Leaves small, rather coriaceous and usually sharply nerved from the base. Shoots at first ancipital, rhombic, or square, papillate. Cataphyls 1 or exceptionally 2 pairs, on the basal joint only. Flowers in 4 or 4+2 series. Fruit subovoid, somewhat rough, with erect sepals. Bolivian and southern Andean regions.

Leaves broad for the group (1-2 cm.).

P. argentinum.

Leaves narrow (under 1 cm.).

Rather oblanceolate: spikes very short.

P. Meliae.

Lanceolate: spikes long for the group.

P. Ernstianum.

PHORADENDRON ARGENTINUM (Urban).

Phoradendrum argentinum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 14. 1897.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2.5x10-40 mm.), smooth, the upper rhombically quadrangular. Cataphyls a nearly basal pair, occasionally followed by a second, spreading. Leaves elliptical or oblanceolate-obovate, sometimes rather quadrate, obtuse, 1.2x2.5-5 cm., finely about 3-nerved and veiny, cuneately subsessile. Spikes mostly solitary, short (15 mm.), with about 4 rounded joints some 6-flowered in 4+2 series: peduncle nearly suppressed: scales ciliolate. Fruit round-ovoid, 4 mm. in diameter, cellular-papillate or tuberculate: sepals erect, parted.—Plate 177.

Bolivian region, on *Ruprechtia* etc.—The type from Argentina.

Specimens examined:—ARGENTINA. Chacarita de los Padres, Catamarca (*Hieronymus*, 419, Nov. 1872,—the type). San Lorenzo, Jujui (*Hieronymus & Lorentz*, 237). Sierra de Cordoba (*Stuckert*, 20252).

Phoradendron Meliae n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes short (2.4x10-20 mm.), papillate, the upper rhombically anepital or squarish. Cataphyls a nearly basal pair, sometimes followed by a second some 5 mm. higher. Leaves lanceolate to obovate-oblanceolate, rather mucronately acute, .5-1x2-3.5 cm., usually 3-nerved, cuneately subsessile. Spikes mostly solitary, short (scarcely 10 mm.), with 2 or 3 very short joints some 4- to 6-flowered in 4 or 4+2 series: peduncle nearly suppressed: scales subciliate. Fruit (immature) red, round-ovoid, verrucose, 2-3 mm. in diameter: sepals suberect and parted.—Plate 178.

Bolivian region, on *Melia*, *Larrea* etc.—The type from Paraguay.

Specimens examined:—PARAGUAY. Asuncion (*Balansa*, 2495, May 1874, on *Melia*,—the type). BOLIVIA. Velasco (*Kuntze*, 6). ARGENTINA. Estancia San Teodoro, Cordoba (*Stuckert*, ? 11778, 13337, 20248). Cruz del Eje, Cordoba (*Stuckert*, 14526).

PHORADENDRON ERNSTIANUM Patschovsky.

Phoradendron Ernstianum Patschovsky, Bot. Jahrb. vol. 45. p. 439. 1911.

Somewhat pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (1.2x15-30 mm.), minutely papillate, the upper rhombically 4-angled. Cataphyls a single pair, nearly basal. Leaves lanceolate, acute, scarcely .5x3 cm., 3-nerved, cune-

ately subsessile. Spikes mostly solitary, short (10-25 mm.), with 3-5 rounded joints about 6-flowered in 4+2 series: peduncle nearly suppressed: scales scarcely ciliate. Fruit subglobose, granular, scarcely 3 mm. in diameter: sepals erect, parted.—Plate 177.

Andean region.—The type from Peru.

Specimens examined:—PERU. Balsas to Calendin, Cajamarca (Web-
erbauer, 4251,—the type).

34. LIGAE.

Leaves moderate or small, sharply basinnerved though rather thick. Shoots at first somewhat rhombically flattened. Cataphyls 1 or mostly 2 pairs, on the basal joint only. Flowers usually in 4+2 series. Fruit somewhat papillate, usually with nearly closed sepals. Bolivian region.

Leaves narrow (under 10 mm.).

Short (scarcely 40 mm.): sepals parted.

P. pruinatum.

Moderately long (40-60 mm.): sepals meeting.

P. Liga.

Leaves broad (20 mm. or more).

P. Hieronymi.

PHORADENDRON PRUINATUM (Urban).

Phoradendron pruinatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 14. 1897.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2 or 3x6-15 mm.), smooth, at first rather apically flattened. Cataphyls a single pair, nearly basal, pale-margined. Leaves elliptical-oblong, mucronately subacute, .5-8x 2.5-4 cm., more or less evidently 3-nerved, cuneately subsessile. Spikes mostly solitary, short (about 10 mm.), with 2-4 joints 2-flowered to about 6-flowered in 4+2 series: peduncle nearly suppressed: scales scarcely ciliate. Fruit round-ovoid, nearly smooth, 3x4 mm.: sepals erect.—Plate 178.

Bolivian region (? exclusively) on Leguminosae.—The type from Argentina.

Specimens examined:—ARGENTINA. Catamarca (Lorentz, 382, 688,—the type). Rioja (*Hieronymus & Niederlein*, 165).

PHORADENDRON LIGA Eichler.

Phoradendron Liga Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 m. 1868.

Phoradendron Liga Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 15. 1897.

Viscum Liga Gillies: Hooker & Arnott, in Hooker, Bot. Miscell. vol. 3. p. 355. 1833.

More or less pseudodichotomous, the rather long very slender branches with basal cataphyls only, androgynous. Internodes moderate (1-2x25-60 mm.), smooth, at first rhombic but soon terete. Cataphyls a single pair toward the base, or 2 pairs some 10 mm. apart, scarious-margined. Leaves more or less falcately oblong to narrowly lanceolate, mucronately acute, .5-1x4-6 cm., 3- to 5-nerved, gradually attenuate at base for about 5 mm. rather than petioled. Spikes mostly solitary, moderate (20, becoming 30 mm.), with about 4 slender joints some 10- to 18-flowered in 4+2 series: peduncle about 5 mm. long: scales acute, scarious-margined, little ciliate. Fruit red, subglobose, minutely cellular-papillate, 4 mm. in diameter: sepals closely inflexed.—Plates 179, 180.

Bolivian region.—The type from Argentina.

Specimens examined:—ARGENTINA. Los Cerillos de S. Juan (*Gillies*, —the type of *V. Liga*). Cordoba (*Lorentz*, 395, 431, 471, 478; *Hieronymus*, 729; *Kurtz*, 8434). S. José (*Lorentz & Hieronymus*, 219). Colonia Benites (*Stuckert*, 16437). Bellarita Corrientes (*Stuckert*, 14569). Chacarita de los Padres (*Lorentz & Hieronymus*, 420). Fuerte (*Lorentz*, 344). Catamarca (*Kurtz*, 6772). PARAGUAY. Sta. Elisa, Gran Chaco (*Rojas*, 2732; *Hassler*, 2732). Concepcion (*Hassler*, 7551). Asuncion (*Balansa*, 2496). Yaguaron (*Balansa*, 3218). Central Paraguay (? *Morong*, 618). BOLIVIA. S. Pablo (*Kuntze*, 5).

Phoradendron Hieronymi n. sp.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous?. Internodes rather short (2-3x20-40 mm.), smooth, somewhat compressed or ancipital. Cataphyls usually a basal pair and a second pair some 5 mm. higher, ciliate. Leaves more or less obliquely elliptical to obovate, obtuse, 2-3x4-6 cm., distinctly 5- or 7-nerved, cuneately subpetioled for about 5 mm. Spikes mostly solitary, rather short (15-20 or 25 mm.), with about 3 oblong joints some 8- to 12-flowered in 4 or 4+2 series: peduncle scarcely 5 mm. long, often with about 2 pairs of scales. Fruit subglobose, minutely cellular-papillate, 3 mm. in diameter: sepals closely inflexed but not meeting.—Plate 180.

Bolivian region.—The type from Argentina.

Specimens examined:—ARGENTINA. Chacarita de los Padres, Catamarca (*Hieronymus*, 421, 1872.—the type). Sierra Chica de Cordoba (*Lorentz*, 432). Cruz del Eje, Cordoba (*Stuckert*, 13363). Fuerte (*Lorentz*, 364). Calera (*Lorentz*, 468). Catamarca (*Hieronymus*, Nov. 1873). Guasopampa (*Kurtz*, 6783). Tucuman (*Lillo*, 20256).

35. ENSIFOLIAE.

Leaves long or very narrow, rather heavy, basinerved. Shoots rather quickly terete. Cataphyls 1-4 pairs, on the basal joint only. Flowers mostly in 6 series. Fruit subglobose, smooth or wrinkled, with inflexed sepals. Brazil.

Leaves very narrow, linear, widened upwards.

P. linearifolium.

Leaves oblanceolate.

Narrow (5-20 mm.), tapered upwards.

P. ensifolium.

Broad (20-40 mm.), broadest above the middle.

P. lanceolato-ellipticum.

PHORADENDRON LINEARIFOLIUM Eichler.

Phoradendron linearifolium Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 115. pl. 36. 1868.

Frequently pseudodichotomous, the long branches with basal cataphyls only, or seemingly forked and then with cataphyls on all joints, dioecious. Internodes long and slender (1-2x50-100 mm.), smooth, quickly terete, swollen above. Cataphyls a single pair, nearly basal or as much as 10 or 15 mm. above the base, or 2-4 often very irregularly spaced pairs. Leaves linear-spatulate, very obtuse to emarginate or truncate, .2-.3 or .6x10 to 16 cm., gradually attenuate to the base. Spikes often clustered, moderate (10-15, lengthening to 30 mm.), with 2 or 3 slender joints some 6-flowered in 4 or 4+2 series when pistillate and as much as 50-flowered in 6 series when staminate: peduncle scarcely 1 mm. long, followed by a longer nearly or quite sterile joint. Fruit subglobose, 2-3 mm. in diameter, somewhat rugosely low-granular: sepals not meeting.—Plate 181.

Brazilian region.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro (*Riedel*, the type; *Glaziov*, 9468, 12032-3, 13926, 19419; *Ule*, 4938). Organ Mts. (*Burchell*, 2129).

PHORADENDRON ENSIFOLIUM Eichler.

Phoradendron ensifolium Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 114. pl. 35. 1868.

Viscum ensifolium Pohl in de Candolle, Prodr. vol. 4. p. 281. 1830.

Somewhat pseudodichotomous, the long branches with basal cataphyls only, dioecious. Internodes long and slender (2-3x50-100 mm. or more), smooth, quickly terete. Cataphyls a nearly basal pair with usually a second pair some 10 mm. higher. Leaves lanceolate, obtuse, 1.5-2.5x20-30 cm., very long-attenuate at base, drying golden. Spikes mostly clustered, moderate (30-40 mm.), with about half a dozen joints rounded and about 6-flowered in 4+2 series when pistillate or elongated and some 30-flow-

ered in 6 series when staminate: peduncle scarcely 5 mm. long, with a pair of basal scales. Fruit subglobose, 4 mm. in diameter, nearly smooth, dull: sepals closely inflexed.—Plate 182.

Brazilian region.—The type from Barbacena.

Specimens examined:—BRAZIL. Barbacena (*Pohl*, 106,—the type of *V. ensifolium*; *Warming*, 14, 381). Tristega (*Czermak & Reineck*, 312). Porto Alegre (*Czermak & Reineck*, 637).

PHORADENDRON LANCEOLATO-ELLIPTICUM Eichler.

Phoradendron lanceolato-ellipticum Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 114. pl. 35. 1868.

Viscum lanceolato-ellipticum Pohl in de Candolle, Prodrômus. vol. 4. p. 282. 1830.

V. interruptum de Candolle, Prodrômus, vol. 4. p. 282. 1830.

Scarcely forked, the long branches with basal cataphyls only, dioecious?. Internodes rather long (2-3x50-100 mm. or more, smooth, for a time somewhat flattened. Cataphyls a nearly basal pair followed by 1-3 others at intervals of less than 5 to 25-40 mm. Leaves falcately oblanceolate-oblong, very obtuse, 2-4x10-16 cm., rather short-cuneate at base. Spikes often clustered, moderate (30-40 or 50 mm.), with about 4 slender joints some 20-flowered in 6 series when pistillate: peduncle 5 mm. long, usually with 1 or 2 lower pairs of scarcely ciliate scales. Fruit (immature) somewhat ellipsoidal, 2x3 mm., smooth: sepals closely inflexed.—Plate 183.

Brazilian region.—The type from Goyaz.

Specimens examined:—BRAZIL. Padre Luis Faria, Goyaz (*Pohl*, 273,—the type of *V. lanceolato-ellipticum* and of *V. interruptum*).

36. TURBINISPICAE.

Leaves moderate, lanceolate, basinerved. Shoots for a time ancipital. Cataphyls several pairs, on the basal joint only. Joints of the spikes turbinate many-flowered in 4+2 series. Fruit round, minutely papillate, with closed sepals. Brazil.

Leaves lanceolate.

P. macrarthrum.

PHORADENDRON MACRARTHURUM Eichler.

Phoradendron macrarthrum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 124. pl. 43. 1868.

P. macrarthron Eichler, l. c. p. 107,—in key, 133.

More or less pseudodichotomous, the rather long branches with basal cataphyls only, dioecious?. Internodes rather long (2-4x40-60 mm.),

sharply ancipital. Cataphyls 1 or 2 basal pairs, usually with another pair some 5 mm. higher, tubular-bifid, white-margined. Leaves falcately lanceolate, obtuse, 1.5-3x7-10 cm., distinctly about 5-nerved, cuneately attenuate for 5-10 mm. or more. Spikes mostly solitary, long (30-50 mm.), with about 3 rather slender joints turbinately some 30- to 50-flowered in 4+2 series: peduncle 5-8 mm. long: scales not ciliate. Fruit (immature) subglobose, microscopically cellular-papillate, 4 mm. in diameter: sepals inflexed.—Plate 184.

Brazilian region.—The type from Goyaz.

Specimens examined:—BRAZIL. Goyaz (*Gardner*, 3765,—the type).

37. FALCIFERAE.

Leaves narrowly oblanceolate, falcate, basinerved. Shoots, if somewhat flattened, scarcely angled. Cataphyls about 2 pairs, on the basal joint only. Flowers in 4+2 series. Fruit warty, with closed sepals. South America.

Leaves elongated, finely nerved.

P. falcifrons.

PHORADENDRON FALCIFRONS Eichler.

Phoradendron falcifrons Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 134 m. 1868.

Viscum falcifrons Hooker & Arnott in Hooker, Bot. Miscell. vol. 3. p. 356. 1833.

Scarcely forked, the rather short branches with basal cataphyls only, dioecious. Internodes rather short (2x20-30 mm.), somewhat compressed above but scarcely angled. Cataphyls a basal pair followed by another pair 5-10 mm. higher, tubular. Leaves falcately oblanceolate-oblong, .5-1x 5-7.5 cm., very obtuse, slenderly long-attenuate rather than petioled. Spikes mostly solitary, short (10-20 mm.), with about 3 joints rounded and some 6- to 10-flowered when pistillate and slender and 20- to 30-flowered in 4+2 series when staminate: peduncle 3 mm. long, sometimes with 1 or 2 pairs of basal scales. Fruit ovoid, 3x4 mm., slightly verrucose: sepals closely inflexed.—Plates 185, 186.

La Plata region.—The type from Uruguay.

Specimens examined:—URUGUAY, Rio Uruguay (*Tweedie*,—the type, on laurels). Concepcion (*Lorentz*, 632, 1779, 1879, 4772). An island in Rio Uruguay (*Niederlein*, 102). Sierra de Tambores (*Arechavaleta*, 136). Mattogrosso, etc. (*Kuntze*, 10). Cordillère de Péribébue (*Balansa*, 3219).

38. ANOMALAE.

Tomentose. Leaves small or rather broad, thick though evidently nerved from the base. Shoots scarcely edged. Cataphyls a single pair, on the basal joint only. Flowers in 4+2 series. Fruit round, retrorsely hairy. Southern Andes.

Leaves moderately large (7 cm.): sepals parted. *P. tucumanense*.

Leaves small (under 1 cm. long): fruiting sepals meeting. *P. Kuntzei*.

PHORADENDRON TUCUMANENSE (Urban).

Phoradendrum tucumanense Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 16. 1897.

Not forked, the rather long branches with basal cataphyls only, dioecious. Internodes moderate (2.4x40-50 mm.), densely stellate-tomentose or short-villous like the foliage, compressed and dilated under the nodes becoming terete. Cataphyls a single pair, about 5 mm. above the base, scarcely tubular. Leaves lanceolate or the lowest elliptical, typically acute, 1.5-3x7-9 cm., cuneately rather slender-petioled for 15-20 mm. Spikes often clustered, moderate (25-35, becoming 50 mm. in fruit), tomentose, with about 3 rather stout joints some 18-flowered in 4+2 series when pistillate and as much as 50-flowered in 6 series when staminate: peduncle 2 mm. long, often followed by a somewhat longer sterile joint: scales deeply parted. Fruit subglobose, dark red, 3 mm. in diameter, retrorsely hairy: sepals nearly glabrous, suberectly parted.—Plates 187, 188.

Bolivian region (? exclusively) on *Fagara*.—The type from Argentina.

Specimens examined:—ARGENTINA. Siambon, Sierra de Tucuman (*Lorentz & Hieronymus*, 223, 235, 335, 782, 1874,—the types). Cuesta de Periquillo (*Lillo*, 5414). BOLIVIA. La Merced, Bermejo (*Fiebrig*, 2174). COUNTRY?. San Luis (*Pearce*, 1864).

PHORADENDRON KUNTZEI (Urban).

Phoradendrum Kuntzei Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 11. 1897.

Not forked, the moderate branches with basal cataphyls only, dioecious. Internodes moderate (2x30 mm. or more), densely yellow-tomentose like the foliage, somewhat compressed under the nodes becoming terete. Cataphyls a single nearly basal pair. Leaves (on the young growth) short-oblong, scarcely 2x5 mm., sessile, caducous. Spikes mostly clustered, rather long (40 mm.), tomentose, with about 3 oblong or clavate joints some 30-flowered when pistillate and 60-flowered when staminate

ir. 4+2 series: peduncle 4 mm. long: scales rather deeply parted. Fruit subglobose, 4-5 mm. in diameter, retrorsely hairy: sepals pubescent, incurved.—Plate 188.

Bolivian region (? exclusively) on cacti.—The type from Bolivia.

Specimens examined:—BOLIVIA. Tunari Mts. at 1300 m. (*Kuntze*, 20, June 1892,—the type). Cotana, at 2500 m. (*Buchtien*, 3156).

C. PENNINERVIAE.

Nerves pinnate from a midrib which usually continues through the leaf but sometimes vanishes below the middle; never with several equally strong nerves from the base.

Leaves thick and opaque.

Stem 4-lined: midrib evanescent.

EGGERSIAE.

Stem ancipital or terete.

Leaves elongated (1:3-4), dull.

UNDULATAE.

Leaves broad (1:2).

Spikes very long, Venezuelan.

P. polygynum.

Spikes moderate. Bahamian.

NORTHROPIAE.

Leaves fleshy: stem bluntly square.

RUGULOSAE.

Leaves drying rather leathery or papery.

Not or scarcely revolute.

Midrib evanescent.

HEYDEANAE.

Midrib percurrent.

PTERONEURAE.

Revolute.

HEXASTICHAE.

Leaves herbaceous, dull: stem sharply ancipital.

PERUVIANAE.

39. EGGERSIAE.

Leaves large, rather thick and dull, evanescently heavily pinnately nerved. Shoots acutely quadrangular. Cataphyls 2 pairs, on the basal joint only. Spikes stout and long. Flowers in 4+2 series. Fruit granular, with widely parted sepals. Andes.

Leaves ovate.

P. Eggersii.

PHORADENDRON EGGERSII (Urban).

Phoradendrum Eggersii Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 10. 1897.

Scarcely forked, the branches with basal cataphyls only, androgynous?. Internodes rather short, stout (3-5x25-50 mm.), nearly smooth, square or 4-keeled, slightly swollen but not compressed at the nodes. Cataphyls a basal pair followed by another more or less fertile pair some 10 mm. higher. Leaves very broadly elliptical or ovate, very obtuse, 7-11x11-15 cm., abruptly petioled for 15-20 mm., rather thick and dull, obscurely pinnately veined below the middle. Spikes mostly clustered,

rather long (40-60 mm.), with about 3 stout oblong joints 22- to 30-flowered in 4+2 series: peduncle almost suppressed. Fruit globose, tuberculate, 5 mm. in diameter: sepals widely spreading with upcurved tips.—Plate 211.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. Hacienda El Recreo, Manabi (*Eggers*, 15229, Aug. 29, 1893,—the type).

40. NORTHROPIAE.

Leaves moderate or rather large, somewhat thick and dull, scarcely revolute, very obscurely subpinnately nerved. Shoots somewhat rhombic. Cataphyls a single pair,—on all joints? Flowers in 4+2 series. Fruit round, smooth, with parted sepals. Bahamas.

Leaves obovate or spatulate, often emarginate.

P. Northropiae.

PHORADENDRON NORTHROPIAE Urban.

Phoradendron Northropiae Urban, Mem. Torrey Bot. Cl. vol. 12. p. 33. pl. 4. 1902.

Commonly forked or fasciculate, the moderate branches apparently with cataphyls on all joints, androgynous. Internodes moderate (2-5x 20-60 mm.), minutely papillate, for a time somewhat rhombic or compressed, enlarged at the nodes. Cataphyls a single pair 5 mm. or less above the base, or rarely 2 pairs, short-tubular. Leaves obovate to subspatulate, very obtuse to oboordately notched, 2.5-3x3-5, or 4-5x6-10 cm., cuneately subpetioled for 5 mm., obscurely penninerved. Spikes often densely clustered, rather short (20-25 mm.), with about 4 subfusiform moderately thick joints covered by some 8-18 flowers in 4+2 series: peduncle scarcely 5 mm. long, with a second pair of scales. Fruit red, subglobose, smooth: sepals erect, not meeting.—Plate 189.

Bahamian region (? exclusively) on *Mimusops*.—The type from Andros.

Specimens examined:—BAHAMAS. ANDROS ISL. (*Northrop*, 551, 1890,—the type; *Brace*, 5325; *Small & Carter*, 8479).

41. UNDULATAE.

Leaves rather large, lanceolate, thick, dull, obscurely pinnately nerved. Shoots sharply ancipital above. Cataphyls mostly 3-4 pairs, on the basal joint only. Flowers in 4+2 series. Fruit ellipsoid, smooth, with nearly closed sepals. Brazil to the West Indies.

Leaves drying dull. South America.

Spikes rather stout and short.

Spikes long and slender.

Leaves glossy. Caribbees.

P. undulatum.

P. gracilispicum.

P. Herminieri.

PHORADENDRON UNDULATUM Eichler.

Phoradendron undulatum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 122. pl. 39. 1868.

Viscum undulatum Pohl in de Candolle, Prodrum. vol. 4. p. 282. 1830.

Phoradendrum undulatum Urban, Bot. Jahrb. vol. 24. p. 42. 1897,—as to the mainland.

More or less pseudodichotomous or verticillate, the long branches with basal cataphyls only, androgynous. Internodes moderate (2-5x30-70 mm.), smooth, for a time strongly ancipital. Cataphyls a nearly basal pair usually followed by 1 or 2 additional pairs and occasionally by a fourth, at intervals increasing up to 40 mm., tubular, somewhat keeled and pointed. Leaves lanceolate to oblanceolate or somewhat ovate, very obtuse to acuminate, 2-4x7-15 cm., cuneately subpetioled for 5-10 mm. Spikes often clustered, moderate (30, lengthening to 50 mm.), with 4-6 short rather stout joints some 10-flowered in 4+2 series: peduncle very short, with 1 or 2 basal pairs of scales: scales ciliolate. Fruit round-ovoid, smooth, 3 mm. in diameter: sepals somewhat parted.—Plates 190, 191.

Brazilian and Bolivian regions.—The type from Brazil.

Specimens examined:—BRAZIL. Barbacena (*Pohl*, 868, 1828,—the type of *V. undulatum*). Minas Geraes (*Lindberg*, 253). Rio de Janeiro (*Riedel*; *Glaziou*, 4003, 6893, 8243). Without locality (*Burchell*, 4396). BOLIVIA. Yungas (?*Bang*, 363, 2903). Mapiri (*Rusby*, 1546).

Phoradendron gracilispicum n. sp.

Somewhat pseudodichotomous, the long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x40-60 mm.), ancipital and rather persistently 2-keeled. Cataphyls a nearly basal pair usually followed by a second pair some 20 mm. higher, and occasionally by a third pair, acute, 2.5-4x10-16 cm., wing-petioled for 10-15 mm. Spikes often clustered, long (40-70 mm.), reddish, with about 10 slender joints some 12-flowered in 4 or 4+2 series: peduncle 2 mm. long, often followed by 1 or 2 partly or wholly sterile joints: scales and receptacular cups ciliate. Fruit (young) elongated: sepals meeting.—Plate 192.

Isthmian and Venezuelan regions.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Monte de Velirla du Copey (*Tonduz*, 12215, the type). Rio Jesus (*Brenes*, 14519). San José (*Hoff-*

mann, 809, 1857; Tonduz, 1393, 10110). S. Ramon (Brenes, 14406). Piedra Blanca (Pittier, 1258). Los Frailes (Tonduz, 7884). Without locality (Oersted, 3, 3086, in part,—*P. latifolium* Oliver). PANAMA. Chiriqui (?Pittier, 2932, 3312). COLOMBIA. Popayan (?Lehmann, 3565, 8538). Without locality (Kalbreyer, 353). VENEZUELA. Tovar (Fendler, 1109).

Phoradendron Herminieri n. sp.

Phoradendrum undulatum Urban, Bot. Jahrb. vol. 24. p. 42. 1897,—as to the West Indies.

More or less pseudodichotomous, the moderate branches with basal cataphyls only, androgynous. Internodes moderate (2.4x25-40 mm.), the upper somewhat compressed rather than ancipital. Cataphyls mostly 3 pairs, one nearly basal, the others at intervals of 10 or 15 mm., scarcely tubular. Leaves rather ovate-lanceolate, attenuately subacute to obtuse, 2.5-3x6-9 cm., cuneately subpetioled for about 5 mm. Spikes more or less clustered, rather long (25, becoming 40 mm.), with half a dozen rather slender joints some 10-flowered in 4+2 series: peduncle very short, usually followed by 1 or 2 equally short joints and a longer sterile joint: scales scarcely ciliate. Fruit (immature) round-ovoid, smooth, 3x4 mm.: sepals nearly meeting.—Plate 191.

Caribbean region.—The type from Guadeloupe.

Specimens examined:—CARIBBEES. GUADELOUPE (*Duss*, 3904 in part, —the type, 2966 in part, 4157, 4418 in part; *L'Herminier*, a). DOMINICA (*Lloyd*, 207).

42. PERUVIANAE.

Leaves rather large except in one species, lanceolate or ovate-lanceolate, dull, drying rather thick, pinnately nerved from a more or less evanescent midrib beneath. Shoots ancipital. Flowers in 4+2, 6 or 6+2 series. Fruit round, mostly smooth, with closed sepals. Andes.

Spikes rather stout.

Leaves elliptical-ovate, obtuse.

Spikes stout-peduncled; flowers in 6 series.

P. peruvianum.

Spikes slender-peduncled: flowers in 4+2 series.

P. Balansae.

Leaves elongated lanceolate, subacute.

P. Mandonii.

Leaves lance-ovate, subacute.

Spikes moderate (30 mm.).

P. avenia.

Spikes rather long and relatively slender.

P. Englerianum.

Spikes very slender and short.

P. Mathewsi.

PHORADENDRON PERUVIANUM Eichler.

Phoradendron peruvianum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 123. 1868.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x20-60 mm.), nearly smooth, ancipitally compressed, somewhat dilated upwards. Cataphyls a single pair towards the base, somewhat spreading, white-margined. Leaves broadly lanceolate, sometimes falcate, acute to obtuse, 3-4 or 5x6-12 cm., rather abruptly petioled for 5-7 mm. Spikes solitary, moderate (becoming 40-50 mm.), with 3 or 4 stout oblong joints nearly 50-flowered in 6 or 6+2 series: peduncle stout, 3-5 mm. long. Fruit red, subglobose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 193.

Andean region.—The type from Peru.

Specimens examined:—PERU. Without locality (*Ruiz*,—the type).

Phoradendron Balansae n. sp.

Somewhat pseudodichotomous, the rather long branches with basal cataphyls only, androgynous?. Internodes rather long (2-4x40-100 mm.), granular, strongly ancipital but little dilated. Cataphyls a single pair somewhat above the base, openly tubular, white-margined. Leaves elliptical to oblanceolate-oblong, sometimes oblique, very obtuse, 2.5-3.5x5.5-7.5 cm., cuneately wing-petioled for about 10 mm. Spikes mostly solitary, moderate (20, becoming 30 mm.), with about 3 moderately stout elongated joints rather turbinate some 18- to 26-flowered in 4+2 series: peduncle nearly suppressed, usually followed by an elongated nearly or quite sterile joint. Fruit subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 194.

Bolivian region, on *Punica* etc.—The type from Paraguay.

Specimens examined:—PARAGUAY. Asuncion (*Balansa*, 2497, May 1874,—the type). Resistencia, Charco (*Stuckert*, 13363, 18606). ARGENTINA. Tucuman (*Stuckert*, 20256). Sierra de Guasapampa, Cordoba (*Kurtz*, 6784). Rio La Plata (*Palmer*, 1853-4). Concepcion (*Hassler*, 7436,—f. *Hassleri* (Pl. 195), with cylindrical spike-joints). Pilcomayo River (*Morong*, 954,—f. *Morongi*, with 2 pairs of cataphyls).

PHORADENDRON MANDONII Eichler.

Phoradendron Mandonii Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 124. 1868.

Scarcely forked, the long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x40-60 mm.), smooth, ancipital. Cataphyls a basal pair, sometimes closely followed by a second, tubular-bifid. Leaves more or less obliquely lanceolate, subacute, 2-3x8-10 cm., cuneately wing-petioled for about 10 mm. Spikes mostly solitary, moderate (30 mm.), with about 3 stout joints some 10 to 18-flowered in 4+2 series:

peduncle 3 mm. long. Fruit globose, dull, obscurely granular, 4 mm. in diameter: sepals closely inflexed.—Plate 197.

Andean region.—The type from Bolivia.

Specimens examined.—BOLIVIA. Sorata, Larecaja, at 10000 ft. (*Mandon*, 1467, Feb. 1861.—the type).

Phoradendron avenia n. sp.

Phoradendron quadrangulare avenia Hieronymus in Herb. Berolin.

Scarcely forked, the moderate branches with basal cataphyls only, androgynous?. Internodes short and stout (3-6x20-30 mm.), smooth, anapical or rhombically 4-angled, dilated upwards. Cataphyls a single pair nearly 10 mm. above the base, acute. Leaves broadly lanceolate or ovate-lanceolate, rather acute, 1.5-2x3.5-5 cm., cuneately petioled for 5-7 mm. Spikes mostly solitary, moderate (30 mm. in fruit), with about 4 short stout oblong joints some 6-flowered in 4+2 series: peduncles 2-3 mm. long, sometimes followed by a sterile joint. Fruit globose, nearly smooth, 3 mm. in diameter: sepals inflexed.—Plate 195.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA. Paramo de Coper (*Stuebel*, 105, July 1868,—the type).

PHORADENDRON ENGLERIANUM Patschovsky.

Phoradendron Englerianum Patschovsky, Bot. Jahrb. vol. 45. p. 439. 1911.

Scarcely forked, the long branches with basal cataphyls only, dioecious?. Internodes rather long (2-4x30-70 mm.), slightly granular, anapical or rhombically somewhat quadrangular, dilated at the nodes. Cataphyls a nearly basal pair, sometimes followed closely by a second or even by a third pair some 10 mm. distant, short and spreading. Leaves lanceolate, obtuse, 2.5-6x9-15 cm., cuneately petioled for scarcely 5 mm. Spikes more or less clustered, rather long (40-60 mm.), with half a dozen long slender joints some 40- to 60-flowered in 4+2 or 6 series: peduncle scarcely 2 mm. long. Fruit (immature) subglobose, smooth, 3 mm. in diameter: sepals inflexed.—Plate 196.

Andean region.—The type from Peru.

Specimens examined:—PERU. Chanchamayo Valley, Funin, Tarma (*Weberbauer*, 1903 pistillate, 1904 staminate, Dec. 1902,—the types).

Phoradendron Mathewsi n. sp.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-5x30-60 mm.), nearly smooth,

ancepital, somewhat thickened at the nodes. Cataphyls a single nearly basal pair, short and spreading, white-margined. Leaves somewhat obliquely elliptical-lanceolate, acute or obtuse, 2-4x6-8 cm., cuneately wing-petioled for scarcely 10 mm. Spikes clustered, short (20 mm.), with 3 or 4 short but very slender joints some 8-flowered in 4+2 series: peduncle 2 mm. long. Fruit (immature) globose, smooth, 2 mm. in diameter: sepals closely inflexed.—Plate 197.

Andean region.—The type from Peru.

Specimens examined:—PERU. Chacapoyas (*M. Mathews*, 1846,—the type, in the Delessert Herbarium at Geneva).

43. RUGULOSAE.

Leaves moderate, rather fleshy, drying finely rugulose, scarcely revolute, subpinnately veined. Shoots fleshy, drying somewhat rugosely quadrangular. Cataphyls several pairs, on the basal joint only. Flowers in 4 or 4+2 series. Fruit round, nearly smooth, with closed sepals. Brazil. Leaves broadly elliptical.

P. Warmingii.

PHORADENDRON WARMINGII Eichler.

Phoradendron Warmingii Eichler in Warming, Vidensk. Meddel. Naturhist. Foren. Kjöbenhavn. 1870. p. 209.

Phoradendron sp. Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 117. 1868.

Phoradendrum rugulosum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 13. 1897.

More or less forked, the moderate branches with basal cataphyls only, androgynous. Internodes rather short (2-6x30-50 mm.), fleshy and wrinkled in drying, quadrangular, minutely papillate like the foliage. Cataphyls a nearly basal pair mostly followed by a second and sometimes by a third pair at intervals of 10-15 mm., or exceptionally 6-8 crowded pairs, ovate, rather spreading. Leaves broadly elliptical to elliptical-obovate, mostly very obtuse, 2.5-4x4-6 cm., more or less abruptly wing-petioled for 3 or 5-10 mm. Spikes mostly clustered, moderate (30-40 mm.), with about 3 swollen joints some 6- to 18-flowered in 4 or 4+2 series: peduncle short, usually with 2 or 3 pairs of scales. Fruit subglobose, nearly smooth, 4 mm. in diameter: sepals inflexed.—Plate 198.

Brazilian region (? exclusively) on *Vochysia*.—The type from Lagoa Santa.

Specimens examined:—BRAZIL. Lagoa Santa (*Warming*, 383, Jan. 14, 1865,—the type). Organ Mts., Rio de Janeiro (*Glaziou*, 4012, Apr. 1870,—the type of *P. rugulosum* which in this specimen differs in its longer petioles and shorter fewer-flowered spike-joints, but is otherwise scarcely distinguishable from the type).

44. HEYDEANAE.

Leaves large, rather thin, finely pinnately nerved below the middle. Shoots rhombically ancipital. Cataphyls typically a single pair, on the basal joint only. Flowers in 4+2 series. Central America.

Leaves ovate: spike-joints turbinate-ly flowered.

P. Heydeanum.

Phoradendron Heydeanum n. sp.

Pseudodichotomous, the long branches with basal cataphyls only, dioecious?. Internodes moderate (2-4x30-50 mm.) sharply ancipital, somewhat rhombically widened below the nodes. Cataphyls a single basal pair, or occasionally 2 or 3 pairs, tubular-bifid. Leaves ovate-lanceolate, 5x10 cm., or obovate and reduced to 2x3.5 cm., subobtusely, rather abruptly wing-petioled for about 10 mm. Spikes often clustered, moderate (30-50 mm.), with 4-5 slender elongated joints somewhat turbinate-ly about 16-flowered in 4+2 series: peduncle 2-4 mm. long. Fruit?—Plate 199.

Guatemalan and Isthmian regions.—The type from Guatemala.

Specimens examined:—GUATEMALA. San Miguel Uspantan, Quiche (*Heyde & Lux*, 3140, Apr. 1892,—the type). COSTA RICA. Paramo del Abejoval (? *Tonduz*, 1840). Tucurique (? *Tonduz*, 13142). These latter,—f. *australis*,—have smaller leaves (3.5x5 cm.) and subglobose smooth immature fruit 3 mm. in diameter, with closely inflexed sepals.

45. HEXASTICHAE.

Leaves moderate or rather large, rather thick and chartaceous, revolute, pinnately nerved. Shoots compressed or ancipital. Cataphyls a single pair, on the basal joint only. Flowers mostly in 6 series. Fruit round, smooth, with closed sepals. West Indies and eastern Mexico.

Leaves ovate to lanceolate.

P. hexastichum.

Leaves elliptical.

P. Oliverianum.

PHORADENDRON HEXASTICHUM Grisebach.

Phoradendron hexastichum Grisebach, Fl. Br. W. I. p. 313. 1860.

Viscum hexastichum de Candolle, Prodr. vol. 4. p. 282. 1830.

Phoradendrum hexastichum Urban, Bot. Jahrb. vol. 24. p. 46. 1897.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2-6x30-60 mm.), smooth, sharply ancipital or somewhat rhombic and dilated upwards. Cataphyls a single pair, scarcely 5 mm. above the base, openly annular. Leaves ovate, very obtuse, 3-5x8-9 cm., cuneately or rather abruptly petioled for 5-8 mm. Spikes more or less clustered, rather long (20, becoming 40-60 mm.),

with about 4 slightly clavate joints some 18- to 42-flowered in 6 or 8 series: peduncle scarcely 5 mm. long, sometimes with a basal pair of scales. Fruit white, globose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 200.

Antillean and Caribbean regions.—The type from Cuba.

Specimens examined:—ANTILLES. CUBA (*de la Ossa*, 1825,—the type of *V. hexastichum*; ?*Shafer*, 8590, *Wright*, 1252). HAITI (*Picarda*, 1623; *ex. herb. Sprengel*, as *V. myrtilloides*). SANTO DOMINGO (*Eggers*, 1899; *Lloyd*, 765; *Taylor*, 328; *v. Tuerckheim*, 3284; *Wright*, *Parry & Brummel*, 460). PUERTO RICO (*Hess*, 675; *Sintenis*, 2836, 5383). CARIBBEES. GUADELOUPE (*Duss*, 4137). MARTINIQUE (*Bélanger*, 131; *Duss*, 1375, 4415; *Hahn*, 1386; *Sieber*, 227 in part). ST. VINCENT (*Guilding*; *Smith*, 297). GRENADA (*Broadway*, 1021).

With lanceolate leaves only 2-2.5 cm. wide, it is var. *angustifolia*, *Phoradendron hexastichum angustifolium* Krug & Urban, Bot. Jahrb. vol. 24. p. 46. 1897, from Grenada (*Eggers*, 6140),—connected with the type by *Broadway*, 1894, from the same island.—Plate 201.

Phoradendron Oliverianum n. sp.

More or less fascicled, the moderate branches with basal cataphyls only, dioecious?. Internodes rather short (2.5x20-50 mm.), nearly smooth, the upper ancipital and somewhat dilated upwards. Cataphyls a single pair, mostly 5-10 mm. above the base, ovate, spreading. Leaves elliptical or subovate, more or less mucronulate but very obtuse, 2 or 2.5-4x4.5-6 or 10 cm., cuneately or rather abruptly petioled for 5-8 mm. Spikes more or less clustered, moderate (20-35 mm.), with about 3 subfusiform joints some 10- to 24-flowered in 4-6 series: peduncle 2-5 mm. long. Fruit?.—Plate 201.

Eastern Sierra Madre region.—The type from eastern Mexico.

Specimens examined:—MEXICO. El Mirador, Vera Cruz (*Liebmann*, 6, 3085, 1842,—the type: *P. hexastichum* Oliver, Vidensk. Meddel. Naturh. Foren. Kjöbenhavn. 1864. p. 175).

46. PTERONEURAE.

Leaves usually large, more or less coriaceous, rarely revolute, pinately nerved. Shoots subterete to ancipital, 2-keeled or quadrangular. Cataphyls 1- several pairs, on the basal joint only or on all in cases of forking. Flowers in 4-6 series. Fruit rounded, mostly smooth, with more or less closed sepals. West Indies and South America.

Usually forking and hence with cataphyls on all joints. *P. racemosum*. Cataphyls on the basal joints only.

- Spikes rather slender: cataphyls a single pair. *P. productipes*.
 Spikes clavate.
 Cataphyls a single pair.
 Internodes flattened. *P. bolivianum*.
 Internodes not dilated. *P. cerinocarpum*.
 Cataphyls 1-2 pairs: internodes 2-winged. *P. carinatum*.
 Cataphyls several pairs: internodes not compressed.
 Cataphyls 2 pairs: shoots quadrangular. *P. Brittonianum*.
 Cataphyls 3 pairs: shoots 2-keeled. *P. pteroneuron*.

PHORADENDRON RACEMOSUM Northrop.

- Phoradendron racemosum* Northrop, Mem. Torr. Bot. Cl. vol. 12. p. 33. 1902.
Viscum racemosum Aublet, Guian. vol. 2. p. 895. 1775.
V. latifolium Lamarek, Encycl. vol. 3. p. 57. 1789.
V. macrophyllum Sprengel, Syst. vol. 1. p. 488. 1825.—de Candolle, Prodr. vol. 4. p. 282.
V. pennivenium de Candolle, Prodr. vol. 4. p. 282. 1830.
V. glandulosum Miquel, Linnaea. vol. 18. p. 60. 1844.
Phoradendron hexastichum latifolium Grisebach, Cat. p. 120. 1866.
P. pennivenium Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 128. pl. 42. 1868.
P. cayennense Eichler, l. c. p. 129. 134 m. 1868.
P. glandulosum Eichler, l. c. p. 134 m. 1868.
Phoradendrum racemosum Krug & Urban, Bot. Jahrb. vol. 24. p. 46. 1897.

Usually forked and the long branches therefore mostly with cataphyls on all joints, androgynous. Internodes long (2.5x70-150 mm.), sometimes granular, nearly terete, somewhat enlarged below the nodes. Cataphyls a basal pair, mostly followed by a second or occasionally a third pair at intervals of 5-10 mm., subannular. Leaves from broadly lanceolate to elliptical, ovate or orbicular, very obtuse or somewhat blunt-acuminate, 5-8 or 10x10-16 cm., usually abruptly wing-petioled for 10-20 mm. Spikes often clustered, long (30-50 or 70 mm.), with mostly 4 or 5 rather long joints thickened except at the ends, some 20-flowered in 4+2 series: peduncle some 8 mm. long, with a basal pair of scales. Fruit white, round-ellipsoid, mostly smooth, 3x4 mm.: sepals inflexed or somewhat parted.—Plates 202, 203.

Upper West Indies and Northern South America; absent from the intervening Caribbees.—The type from Cayenne.

Specimens examined:—BAHAMAS. ANDROS (*Northrop*, 704). ANTILLES. CUBA (*Wright*, 438=1252 in part). HAITI (*Picarda*, 1605b; *Christ*, 1960; *Nash*, 150a). STO. DOMINGO (*Eggers*, 1741, 2011; *Kuntze*, 415; *Preneloup*, 507; *Taylor*, 28, 415). PUERTO RICO (*Bertero*, 1820,—

the type of *V. macrophyllum*; Britton, Stevens & Hess, 2535, 2569; Cowell, 626; Eggers, 880; Heller 514; Kuntze, 219, 415; Sintenis, 6758 as host; Stevens, 4817 as host). FRENCH GUIANA (*Perrottet*, 1820 the type of *V. penninivium*). SURINUM (*Wulfschlaegel*, 1481; *Focke*,—the type of *V. glandulosum*). BRITISH GUIANA (*Im Thurn*, Sept. 1879; *Jenman*, 2218, 4055; *Schomburgk*, 554). VENEZUELA, on the lower Orinoco (*Rusby*, 1896).

***Phoradendron productipes* n. sp.**

Phoradendron hexastichum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 129. pl. 43. 1868,—as to Brazil.

Somewhat pseudodichotomous, the long branches with basal cataphyls only, androgynous. Internodes moderate (2-4x40-160 mm.), smooth, for a time somewhat rhombically ancipital, scarcely enlarged upwards. Cataphyls a single nearly basal pair, subannular. Leaves elliptical-oblongate or obovate, very obtuse, 4-6x8-12 cm., acutely attenuate at base and wing-petioled for 15 mm. Spikes more or less clustered, rather long (30-50 mm.), with about 4 rather long and slender fusiform joints some 24- to 30-flowered in 6 series: peduncle 3-5 mm. long. Fruit globose, smooth, 4 mm. in diameter: sepals inflexed and nearly meeting.—Plate 204.

Brazilian region.—The type from Ceara.

Specimens examined:—BRAZIL. CEARA (*Gardner*, 1676,—the type, 1679). San Gabriel da Cachoeira, Rio Negro (*Spruce*, 2112,—the type of *P. hexastichum* var. *longispica* Eichler, l. c.).—Plate 204.

***Phoradendron bolivianum* n. sp.**

Scarcely forked, the moderate branches with basal cataphyls only, androgynous?. Internodes short (2-3x20-30 mm.), nearly smooth, at first rhombically very sharply ancipital, somewhat dilated upwards. Cataphyls a single basal pair or as many as 4 crowded pairs, somewhat openly tubular. Leaves elliptical-oblongate, sometimes mucronate, very obtuse, 4-5x7-11 cm., acutely attenuate to a winged petiole scarcely 10 mm. long. Spikes mostly solitary, rather long (20, becoming 50 mm.), with about 4 fusiform-oblong joints some 24- to 40-flowered in 6 series: peduncle 3 mm. long, often followed by a sterile joint. Fruit (immature) globose, smooth, 4 mm. in diameter: sepals closely inflexed.—Plate 205.

Bolivian region.—The type from Bolivia.

Specimens examined:—BOLIVIA. Yungas (*Bang*,—as a second collection for 632,—the type). Mapiri (*Rusby*, 1547). Tumupasa, at 1800 ft. (*Williams*, 581).

Phoradendron cerinocarpum C. Wright n. sp.

Phoradendron cerinocarpum C. Wright in herb.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous?. Internodes moderate (2-3x30-60 mm.), smooth, rhombic or ancipital. Cataphyls a single pair, nearly basal, little tubular, white-margined. Leaves broadly lanceolate, very obtuse, as much as 7x16 cm., cuneately subpetioled for 10 mm. Spikes mostly solitary, moderate (30 or 40 mm.), with about 3 rather thick joints somewhat turbinate about 20-flowered in 4+2 series: peduncle 2 or 3 mm. long, sometimes with a basal pair of white-margined scales. Fruit red, nearly globose, 3-4 mm. in diameter, smooth: sepals scarcely meeting.—Plate 206.

Antillean region.—The type from Santo Domingo.

Specimens examined:—ANTILLES. SANTO DOMINGO. Without locality (*Wright, Parry & Brummel*, 459,—the type). Barahona (*Fuertes*, 275, 927). Azua (*Rose, Fitch & Russell*, 3936).

Phoradendron carinatum n. sp.

Scarcely forked, the long branches with basal cataphyls only, androgynous. Internodes rather stout and long (3-5x40-80 mm.), nearly smooth, sharply 2-keeled, scarcely dilated upwards. Cataphyls a nearly basal pair, sometimes followed by a second pair scarcely 10 mm. higher, subannular. Leaves lanceolate, sometimes falcate or somewhat dimidiate, rather acute, 4-6x15 cm. or longer, cuneately subsessile. Spikes mostly solitary, moderate (40-60 mm.), with 4-6 rather stout oblong joints turbinate some 25-flowered in 4 or 4+2 series: peduncle 2 mm. long. Fruit (immature) round-ellipsoidal, essentially smooth, 3x4 mm.: sepals inflexed and nearly meeting.—Plate 207.

Cayenne region.—The type from Demerara.

Specimens examined:—BRITISH GUIANA (*Jenman*, 2542, Nov. 1886,—the type). Noted as the largest-leaved of the Demeraran species.

PHORADENDRON BRITTONIANUM Rusby.

Phoradendron Brittonianum Rusby, Mem. Torrey. Bot. Cl. vol. 4. p. 254. 1895.

More or less forked, the long stout branches with basal cataphyls only, androgynous?. Internodes moderate (3-5x50-70 mm.), nearly smooth, from ancipital becoming sharply quadrangular and finally terete, somewhat swollen at the nodes. Cataphyls 2 pairs, respectively 5 and 25 mm. above the base, subannular or broadly triangular and acute. Leaves round-ovate to elliptical, very obtuse, 8x11 cm., abruptly contracted to a stout petiole 15 mm. long. Spikes more or less clustered, rather long

(over 50 mm.), with about half a dozen ellipsoid joints some 14-flowered in 4+2 series: sepals deep red, widely spreading at anthesis: peduncle nearly 10 mm. long, sheathed by about 4 pairs of overlapping scales. Fruit?—Plate 208.

Bolivian region.—The type from Bolivia.

Specimens examined:—BOLIVIA. Yungas (*Bang*, 632, 1890,—the type). Apolo, at 4800 ft. (*Williams*, 178).

PHORADENDRON PTERONEURON Eichler.

Phoradendron pteroneuron Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 127. 1868.

Scarcely forked, the rather long branches with basal cataphyls only, androgynous. Internodes moderate (2.5x30-100 mm.), nearly smooth, from somewhat rhombic becoming 2-keeled and terete, more or less swollen at the nodes. Cataphyls a nearly basal pair, followed by 2-4 other pairs at intervals increasing to 20 mm., subannular-bifid. Leaves round-elliptical, 5-7x8 cm., or elliptical-obovate and scarcely 2.5x5 cm., very obtuse, cuneately or abruptly petioled for some 10 mm. Spikes more or less clustered, rather long (40-50 mm.), with about half a dozen ellipsoidal joints some 14-flowered in 4+2 series: peduncle 5 mm. long, sometimes with several pairs of sheathing scales. Fruit (immature, said to be whitish) subglobose, fleshy-wrinkled, 3 mm. in diameter: sepals dull red, closely inflexed.—Plate 209.

Brazilian region.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro (*Glaziou*, 1462, 1887, —taken as type). Ilheos (*Riedel*, 1829). Mattogrosso (*Robert*, 439). Ceara (*Gardner*, 1677). Pernambuco (*Schenck*, 4282).

II. SQUAMOSAE.

Leaves reduced to scales which do not disarticulate. Glabrous throughout. Brazil.

Stem terete, fleshy and wrinkled.

Stem very flat, striate.

FRAGILES.

TUNAEFORMES.

47. FRAGILES.

Leaves reduced to small scales. Shoots terete. Cataphyls one or two pairs, on the basal joint only. Flowers in 4+2 series. Fruit wrinkled, with somewhat parted sepals. Brazil.

Internodes subcylindrical, very short.

P. fragile.

PHORADENDRON FRAGILE (Urban).

Phoradendrum fragile Urban, Bot. Jahrb. v. 23. Beibl. 57. p. 13. 1897.

Scarcely forked, the rather short sometimes red branches with basal cataphyls only, dioecious?. Internodes short (2.3x10-25 mm.), terete, fleshy, more or less papillate. Cataphyls a single pair toward the base, or two such pairs, blunt and widely spreading. Leaves minute, scale-like. Spikes more or less clustered, moderate (20, becoming 30 mm. long), with about 4 subglobose joints from very few-flowered to as much as 50-flowered in 4+2 series: peduncle nearly suppressed: scales ciliate. Fruit ellipsoidal, 4x5 mm., somewhat wrinkled but not verrucose: sepals inflexed but scarcely meeting.—Plate 210.

Brazilian region (? exclusively) on *Miconia* and Melastomaceae.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Rio de Janeiro, (*Glaziou*, 10898,—the type). Ilha Grande, Rio de Janeiro (*Rose & Russell*, 20369). S. Paulo (*Glaziou*, 11608). Goyaz (*Glaziou*, 22023).

48. TUNAEFORMES.

Leaves reduced to small scales. Shoots very thin and flat. Cataphyls a single pair, on the basal joint only. Flowers in 4+2 series. Fruit ovoid, granular, with parted sepals. Brazil.

Internodes elliptical-oblong.

P. tunaeforme.

PHORADENDRON TUNAEFORME Eichler.

Phoradendron tunaeforme Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 108. pl. 32. 1868.

Viscum tunaeforme de Candolle, Prodrum. vol. 4. p. 284. 1830.

More or less pseudodichotomous, the elongated branches with basal cataphyls only, androgynous. Internodes short (1.5x20-30 mm.), greatly flattened, slightly papillate, striately ribbed. Cataphyls a single nearly basal pair, tubular-bifid. Leaves minute, scale-like. Spikes more or less clustered, very short (5 mm.), usually of a single joint about 6-flowered in 4+2 series: peduncle nearly suppressed: scales scarcely ciliate. Fruit ovoid, 3x4 mm., granular: sepals parted.—Plate 210.

Brazilian region.—The type from Musquitos.

Specimens examined:—BRAZIL. Serra de S. Feliz, Musquitos (*Pohl*, 1928, 1839,—the type of *V. tunaeforme*, and of *V. articulatum* Pohl in herb.). Piahy (*Gardner*, 1958). Lagoa Santa (*Warming*, 17, 384). Goyaz (*Glaziou*, 22024). Pernambuco (*Schenck*, 4238). Maracas, Bahia (*Ule*, 6948). Bahia (v. *Martius*). Araraquara, S. Paulo (*Löfgren*, 1074). Without locality (*Vauthier*).

E. PARADOXAE.

Cataphyls on alternate joints or in one species on all joints, the branches normally percurrent. Always glabrous and with foliage leaves. Venezuela.

Cataphyls 2 or 3 deeply tubular pairs.

FENDLERIANAE.

49. FENDLERIANAE.

Leaves moderate, rather thick and dull, somewhat obscurely basinnerved. Shoots nearly terete when with cataphyls or strongly ancipital when without them. Cataphyls mostly 2 or 3 pairs, on all joints or in one species on every alternate joint. Spikes moderate, usually with rather large scales. Flowers in 6 series. Fruit round, smooth, with nearly closed sepals. Venezuela and Guiana.

Cataphyls on all joints.

P. Fendlerianum.

Cataphyls on alternate joints only.

P. paradoxum.

PHORADENDRON FENDLERIANUM Eichler.

Phoradendron Fendlerianum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 129. 1868.

Scarcely forked, the rather long branches with cataphyls on all joints, dioecious?. Internodes moderate (2-3x50-80 mm.), smooth, somewhat compressed above. Cataphyls a nearly basal pair followed by a second or even a third pair at intervals of 10-20 mm. or more, tubular. Leaves round-ovate or elliptical, sometimes oblique, very obtuse or emarginate, 5-7x8-9 cm., rather abruptly petioled for some 10 mm. Spikes clustered, rather long (50-60 mm.), with about 5 clavate joints scarcely 24-flowered in 6 series when pistillate: peduncle some 10 mm. long, usually with 1 or 2 pairs of basal scales: scale-pairs forming rather deep truncate cups. Fruit round, smooth, 4 mm. in diameter: sepals inflexed but slightly parted.—Plate 211.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1102,—the type).

PHORADENDRON PARADOXUM (Urban).

Phoradendrum paradoxum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 8. 1897.

Scarcely forked, the moderate branches with cataphyls on alternate joints, dioecious?. Internodes rather long (2-7x50-90 mm.) and subterete when with cataphyls, shorter (scarcely 50 mm.) and sharply ancipitally flattened when lacking them, smooth. Cataphyls a pair some 5 mm. above

the base, and a second pair at about the middle of the joint, tubular. Leaves round-ovate, very obtuse, 3-5x6-8 cm., rather abruptly petioled for some 10-15 mm. Spikes mostly solitary, rather long (60 mm.), with half a dozen oblong joints some 30- to 60-flowered in 6 series when staminate: peduncle scarcely 5 mm. long: scale pairs forming rather slender truncate cups. Fruit?—Plate 212.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Karsten*, 5,—the type).

Very like the preceding except in its internodes, and possibly representing its staminate form.

F. CONTINUAE.

Cataphyls on all joints, even when the stem is percurrent. Always glabrous and with foliage leaves. Throughout the range of the Aequatoriales.

Stem always or prevailingly percurrent.

PERCURRENTES.

Stem cymose or dichotomous, rarely if ever percurrent.

DICHOTOMAE.

III. PERCURRENTES.

Branches percurrent, even when frequently forked.

Cataphyls bearing flower-spikes in their axils.*

CRASSIFOLIAE.

Cataphyls not subtending spikes.

Leaves penninerved.

Thick, dull, and opaque.

PIPEROIDES.

Chartaceous, glossy and veiny.

P. racemosum.

Leaves basinerved.

Large, fleshy, dimidiate.

P. obliquum.

Moderate in size and thickness.

Equally nerved on both sides.

Cataphyls 1 pair.

GARDNERIANAE.

Cataphyls 2 or 3 pairs.

Flowers in 2 ranks.

P. Jenmani.

Flowers in 6 ranks.

P. Fendlerianum.

Venulose above, heavy-nerved beneath.

Spikes many-flowered.

FLAVENTES.

Spikes slender, few-flowered.

P. laxiflorum.

Very narrow, linear.

P. linearifolium.

*For comparable cases in other groups see *P. craspedophyllum*, and, as exceptions, *P. Eggersii*, *P. Glaziovii* and *P. Wattii*. Flower-scars have been observed in the axils of cataphyls in *P. longipetiolatum*.

50. CRASSIFOLIAE.

Leaves large, ovate, thick, but rather heavily basinnerved. Shoots terete. Cataphyls on all joints,—several pairs, of which the upper are more or less deciduous and uniformly fertile. Flowers in 4+2 or 6 series. Fruit round, nearly smooth, with closed sepals. Brazil to Central America and the West Indies.

Leaves very thick and dull: fruit yellowish.

P. crassifolium.

Leaves thinner and glossier: fruit red.

P. martinicense.

PHORADENDRON CRASSIFOLIUM Eichler.

Phoradendron crassifolium Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 125. pl. 40. 1868.

Viscum crassifolium Pohl in de Candolle, Prodrum. vol. 4. p. 280. 1830.

Phoradendron pepericarpum A. Gray, U. S. Explor. Exped. . . Wilkes. vol. 15. pt. 1, Botany, Phanerogamia. p. 742. 1854.

Phoradendrum crassifolium Urban, Bot. Jahrb. vol. 24. p. 51. 1897,—as to the mainland.

Occasionally pseudodichotomous, the branches with cataphyls on all joints, androgynous. Internodes rather long (2-4x60-80 mm.), terete. Cataphyls a sterile basal pair sometimes rather closely followed by 2 or 3 other sterile pairs, and about 3 floriferous pairs spaced along the otherwise leafless joint, subannular. Leaves more or less lanceolately or elliptically ovate, obtuse or blunt-pointed, 3x8 to 8-10x16 cm., rounded at base or attenuate for 5-20 mm. Spikes sometimes terminal as well as axillary and occasionally forming a compound terminal inflorescence from the suppression of foliage near the summit, often clustered, moderate (30 mm.), with about 5 round-fusiform joints scarcely 10-flowered in 4+2 or 6 series: peduncle 5 mm. long, often with as many as 5 pairs of crowded scales. Fruit (said to be yellowish) subglobose, slightly low-granular, 4 mm. in diameter: sepals closely inflexed.—Plates 213, 214.

Brazil to Central America, on *Bertiera*, *Coffea*, *Macrocnemum*, *Miconia*, *Rondeletia*, *Schinus*, etc.—The type from Brazil.

Specimens examined:—BRAZIL. Serra d'Ourada (*Pohl*, 457, 1839,—the type of *V. crassifolium*; *Luschnath*; *Claussen*, 43; *Sello*, 5266). Organ Mts. (*Wilkes Exped.*,—the type of *P. pepericarpum*). Rio de Janeiro (*Riedel*; *Glaziou*, 1432-3, 1460, 4004 in part, 4005, 7666, 14884; v. *Martius*; *Wied-Neuwied*; *Peckolt*, 624; *Hieronymus & Niederlein*, 1878; *Ule*, 4598,—with nearly sessile leaves 3x5 cm.). S. Paulo (*Burchell*, 3124, 3165; *Löfgren*, 799). Rio Negro (*Spruce*, 1563; v. *Martius*). Lagoa Santa (*Warming*, 373). Sta. Catarina (*Pabst*, 554 in part; *Ule*, 179). Mattogrosso (*Moore*, 534). Campinas (*de Campos Novaes*, 417 in part). Piahy (*Gardner*, 2620). Pernambuco (*Gardner*, 2881—

sometimes labeled as from Piahy). Rio Colcoene, Para (*Ducke*, 2513). Without locality (*Guillemin*, 43). BOLIVIA. Yungas (*Rusby*, 1387; *Bang*, 657). Mapiri (*Rusby*, as host of 1543). Tipuani, Guanai (*Bang*, 1717). Tumupasa (*Williams*, 428, 594). PERU. La Merced (*Weberbauer*, 1860). Mayobamba (*Martens*, 1622—with leaves 9x16 cm., acuminate produced as in var. *Pittieri*). VENEZUELA. Tovar (*Fendler*, 2396). Without locality. (*Linden*, 43). BRITISH GUIANA. (*Jenman*, 1217, 2533, 3628, *7433).

Two Brazilian forms, sufficiently characterized by their names, are var. *multiflora* Eichler, l. c. p. 125, from Sabara, Minas Geraes (*Riedel*). Santarem, Para (*Spruce*, 732, 904), and Ega, Amazonas (*Poeppig*, 2859,—as *Viscum egense* MS.)—Pl. 214; and var. *parvifolia* Eichler, l. c. p. 125, from Capocabana, Minas Geraes (*Luschnath*, 1839). A Central American form characterized by its bluntly acuminate large leaves, may be known as var. *Pittieri*:—COSTA RICA. Buenos Aires (*Pittier*, 3902, 6580), General (*Pittier*, 3901). Boruca (*Tonduz*, 6863—the type). BRITISH HONDURAS. Toledo (*Peck*, 824).—Plate 215.

Phoradendron martinicense n. comb.

Viscum martinicense de Candolle, Prodr. vol. 4. p. 280. 1830.

Closely resembling *P. crassifolium*, with which it is commonly united, but differing in its rather thinner glossier leaves and apparently red fruit.—Plate 216.

Caribbean region.—The type from Martinique.

Specimens examined:—CARIBBEES. MARTINIQUE (*Sieber*, 227,—the type of *V. martinicense*; *Bélanger*, 130; *Duss*, 101 in part, 1374b; *Hahn*, 298). GUADELOUPE (*Duss*, 2969 in part, 3891, 3902 in part, 3904 in part, 4137a). TRINIDAD (*Broadway*, 2596).

51. PIPEROIDES.

Leaves moderate, broadly lanceolate or ovate, thick with a prominent midrib and obscurely pinnately veined beneath. Shoots quickly terete. Cataphyls on all joints, usually several pairs on the lowermost. Spikes rather slender, red. Flowers in 4, 4+2 or 6 series. Fruit ellipsoid, rather warty, with nearly closed sepals. South America to Mexico and the West Indies.

Leaves lanceolate to ovate or elliptical.

P. piperoides.

Phoradendron piperoides n. comb.

Viscum latifolium Swartz, Prod. Fl. Ind. Occ. vol. 1. p. 268. 1797,—not Lamarek.

- Loranthus piperoides* Humboldt, Bonpland & Kunth, Nov. Gen. Sp. vol. 3. p. 443. 1818.
L. torulosus Humboldt, Bonpland & Kunth, l. c. 1818.
Viscum tereticaule and var. *cubense* de Candolle, Prodromus, vol. 4. p. 280. 1830.
V. saururoides de Candolle, l. c. 1830.
V. piperoides de Candolle, l. c. p. 281. 1830.
V. Schottii Pohl in de Candolle, l. c. p. 281. 1830.
V. Fockeanum Miquel, Linnaea. vol. 18. p. 60. 1844.
V. cornifolium Presl, Epimel. Bot. p. 254. 1849.
V. ellipticum Presl. l. c. 1849.
V. laurifolium Presl, l. c. p. 255. 1849.
Phoradendron Schottii A. Gray, U. S. Explor. Exped. . . . Wilkes. vol. 15. pt. 1, Botany, Phanerogamia. p. 742. 1854.
P. latifolium Grisebach, Fl. Br. W. I. p. 314. 1860.—Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 126. pl. 41,—and most writers.
P. laurifolium Eichler, l. c. p. 107. 1868.
Viscum teretifolium Hemsley, Biol. Centr.-Amer. vol. 3. p. 85. 1882,—name only, by error for *tereticaule*.
Phoradendron tereticaule Index Kewensis. vol. 3. p. 503. 1894,—name only.
P. Biolleyi Krause, Notizbl. K. Bot. Gart. Dahlem. vol. 5. p. 264. 1912.
Phoradendrum latifolium Urban, Bot. Jahrb. vol. 24. p. 49. 1897.

Rather frequently pseudodichotomous or forking, the branches with cataphyls on all joints, androgynous. Internodes rather long (2-4x40-100 mm.), slightly compressed above, quickly becoming terete. Cataphyls 1 or 2-5 pairs toward the base of the lowest joint, a single pair nearly basal or 10-15 mm. above the base of the other joints, subannular, white-margined. Leaves lanceolate to round ovate, mucronately subacute or bluntly acuminate, 1.5x5 to mostly 2.5-5x6-10 or occasionally 7x12 cm., subpetioled for about 5 mm. Spikes mostly clustered, usually dull red, rather long (30-60 mm.), with half a dozen rather slender joints some 10- to 15-flowered in 4, 4+2 or exceptionally 6 series: peduncle 2-3 mm. long. Fruit yellow or orange, ovoid or ellipsoid, warty to smooth, 4x5 mm.: sepals ascending, usually somewhat parted.—Plates 217, 218, 219, 220, 221, 222..

Argentina to Mexico and the West Indies, in a multitude of forms, on numerous dicotyledonous hosts. Should better knowledge of the plants in nature render possible a segregation of these forms, the types already named would center as follows:—Antilles, *V. latifolium*, *V. tereticaule*, and *V. tereticaule cubense* (Pl. 221); Andes, *L. piperoides* and *L. torulosus* (Pl. 220); Brazil, *V. Schottii* (Pl. 217); Cayenne, *V. saururoides* (Pl. 221) and *V. Fockeanum*; Central America, *P. Biolleyi*; Mexico, *V.*

cornifolium (Pl. 222), *V. ellipticum* (Pl. 222), and *V. laurifolium* (Pl. 218).

Specimens examined:—ANTILLES. CUBA (*de la Ossa*,—the type of *V. tereticaule cubense*; Baker, 2602; Britton, Cowell & Shafer, 12928; Dewey, 644; Eggers, 4668, 4724, 4902; Linden, 1960; Mazon, 4337; Rugel, 270; Shafer, 331, 3270, 8116, 8517, 8601, 8607, 8737; Underwood & Earle, 1311; Van Hermann, 4887; Wright, 216=1251a, 217). JAMAICA (Britton, 2687; Harris, 10339). SANTO DOMINGO (Wright, Parry & Brummel, 465). HAITI (Christ, 2232; Nash and Taylor, 1251; Picarda, 1605). PUERTO RICO (Britton, Stevens & Hess, 2470, 4888; Hess, 1913; Sintenis, 339, 339c, 1270, 1388, 4154, 4391, 4494, 4614, 4840). CARIBBEES. GUADELOUPE (Duss, 2969 in part. DOMINICA (Ramage, 1888). MARTINIQUE (Duss, 101 and 4418 in part). GRENADA (Broadway, 1021b, 1873; Eggers, 6077, 6396). ST. VINCENT (Smith, 245 in part, 248). TOBAGO (Broadway, 3982). TRINIDAD (Crueger, 1649, 2724; Fendler, 654; Hart, 6118; Kuntze, 679; Lunt, 6118). CAYENNE REGION. BRITISH GUIANA (Hostmann or Hostmann & Kappler, 729 in part; Jenman, 650, 1218, 2221, 2545, 3781, 3868, 4747; Wulfschlaegel, 991). SURINAM? (Schomburgk; Herb. Torrey. ex. herb. Schweinitz.). FRENCH GUIANA (Gabriel, 1802; Mus. Paris, 198; Patris; Perrottet, 229,—the type of *V. saururoides*, 1820; Poiteau, 1819-1821, 1824; Sagot, 296). BRAZIL. TINGUA (Pohl, 246, 4319, 1828,—the type of *V. Schottii*; Schott). CEARA (Gardner, 1678). NOUVELLE FRIBOURG (Claussen, 44-5). PIAUHY (Gardner, 1960,—sometimes labeled as from Ceara). PARA (Sieber). ILHA MEXICANA. PARA (Guedes, 2365). ILHA MARAJÓ, PARA (Ducke, 2530b). ALAGOAS (Gardner, 1320). BLUMENAU (Ule, 850). STA. CATARINA (Möller; Pabst, 554 in part). S. PAULO (Noack). PUERTO ALEGRE (Czermak & Reineck, 367). SERRA DE S. IGNACIO (Niederlein, 171). MATTO GROSSO (Meyer, 720; Robert, 522). RIO DE JANEIRO (Beyrich; Glaziou, 1428, 1431, 1435, 4008, 7661; Riedel; Schenck, 2132; Sello, 498; Ule, 4800; Weddell, 378). “East Brazil” (Luschnath, 1835; Wied-Neuwied, 1829). Without locality (Burchell, 3313; Claussen; Lund, 385; v. Seneloh, 259). PARAGUAY. ASUNCION (Balansa, 2498). RIO TEbicuari (Kuntze, 16). CORDILLERA DE ALTOS (Fiebrig, 511; Hassler, 913). PARAGUARI (Balansa, 4722). TOBATY (Fiebrig, 51; Hassler, 6364). “South Paraguay” (Kuntze, 17). ARGENTINA. CORDILLERA DE MESCONAS (Niederlein, 1277). PERU. Without locality (Ruiz). ECUADOR. BODEGA (Sodirol, 1872). NANEGAL (Sodirol, 1874). PALOO (Eggers, 14340). Without locality (Eggers, 1400; Sodirol, 148/28). COLOMBIA. POPAYAN (Bonpland, 1871,—the type of *L. piperoides*; Bonpland, 3808,—the type of *L. torulosus*). STA. MARTHA (Smith, 1278). VENEZUELA. QUIQUE (Fendler, 112). PANAMA. SABANA DE LA TORTUGA, CHIRIQUI (Pittier, 3345). CALDERA, CHIRIQUI (Pittier, 3357). CHAGRES (Fendler, 136). MINDI, (Hayes, 616). BISMAREK (Williams,

255). COSTA RICA. San Mateo (*Biolley*, 7072; 7078, 1892,—the type of *P. Biolleyi*). Buenos Aires (*Pittier*, 3903). Juis (*Tonduz*, 11458-9). Without locality (*Oersted*, 3, 3086, in part). NICARAGUA. Bluefields (*Herb. Grisebach.*). GUATEMALA. Patalul, Solola (*Kellerman*, 5822). Torola, Escuintla (*Smith*, 2039). Cubilquitz, Alta Verazaz (v. *Tuerckheim*, 8745). BRITISH HONDURAS. Toledo (*Peck*, 530). Manatee Lagoon (*Peck*, 444). MEXICO. "Temperate East Mexico" (*Leibold*,—the type of *V. laurifolium*). Without locality (*Haenke*,—the types of *V. cornifolium* and *V. ellipticum*). Fortin (*Kerber*, 301). Orizaba to Cordoba (*Bourgeau*, 1962, 2175). Zacuapam (*Purpus*, 3693, 3806, 1912). El Mirador (*Sartorius; Galeotti*, 2695; *Liebmann*). Motzorongo (*J. G. Smith*, 263).

The distinctly hexastichous forma *hexasticha*, which Urban, under *Phoradendrum*, (Bot. Jahrb. vol. 23. Beibl. 57. p. 3. 1897) bases upon *Viscum cornifolium* Presl (Pl. 222), is further represented from Mexico (*Smith*, 263), and finds a counterpart in certain Ecuadorean specimens (*Sodi*, 1872, 1874, 148/28). Ule's no. 4800, from about Rio de Janeiro, presents the exceptional phenomenon in the genus of somewhat branched spikes in some cases, and may be known as f. *composita*.

52. GARDNERIANAE.

Leaves rather small, more or less indistinctly basinerved. Shoots subterete or variously compressed, sometimes very thin and flat. Cataphyls a single basal pair on each joint. Flowers in 4 or 4+2 series. Fruit ovoid, smooth, with parted sepals. South America.

Shoots subterete.

Leaves ovate, broad (2 cm.).

P. Gardnerianum.

Leaves lanceolate, moderate (1.5 cm.).

P. essequibense.

Leaves elliptical, moderate (1 cm.).

Shoots terete.

P. stronglylados.

Shoots somewhat compressed.

P. Johnstoni.

Leaves oblong, narrow (.5 cm.).

Leaves falcate.

P. surinamense.

Leaves not falcate.

P. Caesalpiniae.

Shoots flat, often greatly dilated.

P. platycaulon.

PHORADENDRON GARDNERIANUM (Urban).

Phoradendrum Gardnerianum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 11. 1897.

More or less pseudodichotomous or cymosely forked, the moderate branches with cataphyls on all joints, androgynous. Internodes moderate (2-3x40-70 mm.), quickly terete. Cataphyls a single basal pair, or

this closely followed by a second on the lowermost joint, tubular-bifid, white-margined. Leaves ovate, very obtuse, 2-2.5x3-4 cm., quickly narrowed to the sessile base. Spikes mostly solitary, rather short (25 mm.), with about 4 plump joints some 6-flowered in 4+2 series: peduncle very short, sometimes followed by a partly sterile joint. Fruit (immature) ovoid, smooth, 3 mm. in diameter: sepals ascending, nearly or quite meeting.—Plate 223.

Brazilian region.—The type from Piahy.

Specimens examined:—BRAZIL. Piahy (*Gardner*, 2885, the type).

Phoradendron essequibense n. sp.

Frequently forked, the moderate branches with cataphyls on all joints, androgynous?. Cataphyls a single nearly basal pair, short-tubular, bifid. Leaves lanceolate or ovate, mucronately obtuse or bluntly acuminate to subacute, 1-1.5x4 cm., cuneately subsessile. Spikes solitary, short (15 mm.), with about 3 clavate rather slender joints verticillately 4-flowered: peduncle almost suppressed. Fruit?.—Plate 223.

Cayenne region.—The type from Demerara.

Specimens examined:—BRITISH GUIANA (*Jenman*, 2252, Aug. 1886, the type).

PHORADENDRON STRONGYLOCLADOS Eichler.

Phoradendron strongyloclados Eichler in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 109. 1868.

More or less pseudodichotomous or verticillate, or cymosely forked, the moderate branches with cataphyls on all joints, androgynous. Internodes moderate (2x25-80 mm.), quickly terete. Cataphyls a single basal pair, tubular-parted. Leaves elliptical, obtuse, about 1x2-3 or 4 cm., cuneately sessile. Spikes more or less clustered, short (10-15 mm.), with about 3 very short joints verticillately about 4-flowered: peduncle scarcely 3 mm. long, usually with a basal pair of scales. Fruit ovoid, 3x4 mm., smooth, golden-glistening: sepals erect, widely parted.—Plate 224.

Brazilian region.—The type from Pernambuco.

Specimens examined:—BRAZIL. Pernambuco (*Gardner*, 1029,—the type). Goyaz (*Gardner*, 3205).

Phoradendron Johnstoni n. sp.

Regularly forked, the moderate branches with cataphyls on all joints, androgynous?. Internodes rather short (2-3x20-50 mm.), at first compressed but the lower terete. Cataphyls a single nearly basal pair, short-

tubular or almost annular. Leaves elliptical, obtuse, .6-1x2-3 cm., rather abruptly sessile. Spikes solitary, short (scarcely 15 mm.), with 2 or 3 plump joints verticillately 4-flowered: peduncle almost suppressed. Fruit ellipsoid, smooth, 4x5 mm.: sepals erect, parted.—Plate 225.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Cocke Island (*Johnston*, 10, Aug. 5, 1903,—the type).

PHORADENDRON SURINAMENSE Pulle.

Phoradendron surinamense Pulle, Enum. Vasc. Pl. . . . Surinam. p. 155. pl. 1906.

More or less pseudodichotomous or divaricately cruciform, the moderate branches with cataphyls on all joints, androgynous. Internodes moderate (2x40-60 mm.), quickly terete. Cataphyls a single nearly basal pair, short-tubular. Leaves somewhat falcately oblong or lanceolate, obtuse, .5x2.5-4.5 cm., sessile. Spikes mostly solitary, short (10 mm.), with some 3 clavately thickened joints about 6-flowered in 4+2 series: peduncle 2-3 mm. long, often with a basal pair of scales. Fruit?—Plate 226.

Cayenne region.—The type from Surinam.

Specimens examined:—SURINAM (*Versteeg*, 239, 1903,—the type).

PHORADENDRON CAESALPINIAE Ule.

Phoradendron Caesalpiniae Ule, Bot. Jahrb. vol. 42. p. 200. 1908.

More or less pseudodichotomous or fascicled. The rather long branches with cataphyls on all joints, androgynous. Internodes rather long (2x50-100 mm.), varnished, terete. Cataphyls a single basal pair, annular. Leaves narrowly elliptical-oblong, obtuse, .5x3 cm., sessile. Spikes more or less clustered, short (15-20 mm.), with about 3 tumid joints about 6-flowered in 4+2 series: peduncle about 3 mm. long, with a basal pair of scales. Fruit (immature) ovoid, smooth, 3x4 mm.: sepals erect, parted.—Plate 225.

Brazilian region on *Caesalpinia* etc.—The type from Bahia.

Specimens examined:—BRAZIL. Calderão, Bahia (*Ule*, 7243, Oct. 1906, the type).

PHORADENDRON PLATYCAULON Eichler.

Phoradendron platycaulon Eichler, in v. Martius, Fl. Brazil. vol. 5. pt. 2. p. 108. pl. 33. 1868.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous. Internodes moderate (2x40-60 mm.), flattened or dilated to a width of 5-8 mm. and striate. Leaves oblong

or elliptical, mucronately very obtuse, .3-.5x3-4 cm., or .8x2 cm., quickly subsessile. Spikes more or less clustered, short (15, becoming scarcely 25 mm.), with about 3 swollen joints verticillately 4- to 6-flowered: peduncle scarcely 2 mm. long, sometimes with a basal pair of scales. Fruit red or yellow, ovoid, smooth, 3x5 mm.: sepals erect, parted.—Plate 227.

Brazilian region.—The type from Para.

Specimens examined:—BRAZIL. Barra, Rio Negro (*Spruce*, 1850-51; *Riedel*; *v. Martius*). Santarem, Para (*Spruce*, 1=226, 2=228, 1849-50, —the type). Rio de Janeiro (*Glaziou*, 13925a). CAYENNE. Without data (?*Herb. Mus. Paris.*).

53. FLAVENTES.

Leaves rather large, lanceolate or ovate, usually sharply basinerved and reticulate above, but heavy-nerved and veinless beneath. Shoots 2-edged to nearly terete. Cataphyls on all joints, usually 2 or 3 pairs on the lowermost and a single pair at some distance above the base on the others, triangular, keeled and pointed. Flowers usually in 6 series. Fruit rather ellipsoid, nearly smooth, with closed sepals. Central and South America; one species in the West Indies.

Flowers in 6 series.

Leaves dull and veinless: peduncles long. *P. pachyphyllum*.

Leaves glossy and reticulated above.

Peduncle rather long. *P. Knoopii*.

Peduncle short.

Leaves ovate-lanceolate.

Spikes very long, with elongated joints.

Leaves moderate (4x6 cm.). *P. chrysoclados*.

Leaves large (5x10 cm.). *P. membranaceum*.

Spikes with short joints. *P. quinquenervium*.

Leaves lanceolate.

Moderate, subsessile.

Shoots scarcely keeled. *P. supravenulosum*.

Shoots sharply 2-lined. *P. flavens*.

Large, more petioled. *P. trisulcatum*.

Flowers in about 8 (6-10) series.

Spikes relatively slender, short-stalked. *P. Urbanianum*.

Spikes very stout: peduncle elongated. *P. Lindavianum*.

Phoradendron pachyphyllum n. sp.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (3-5x60-80 mm.), nearly smooth, 2-edged. Cataphyls a single pair 10-15 mm. above the base, deltoid, keeled and pointed. Leaves round-elliptical, obtuse, 5-6x7-9

cm., wing-petioled for 10 mm., 3- to 5-nerved, drying rather thick and veinless. Spikes solitary, long (100 mm.), with about 5 elongated joints some 40- to 60-flowered in 6 series: peduncle 10-15 mm. long, the lower scales forming large funnel-shaped tubes. Fruit (very immature) apparently round, nearly smooth: sepals inflexed.—Plate 228.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Tovar (*Fendler*, 1103, 1103 β ,—the type).

Phoradendron Knoopii Warburg n. sp.

Phoradendron Knoopii Warburg, *Tropenpflanzer*. vol. 9. p. 635. 1905,—name only.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (2-3x60-80 mm.), granular, subterete. Cataphyls usually a nearly basal pair followed by a second pair some 25 mm. higher on the lowest joint, solitary and 15-20 mm. above the base on the others, deltoid, keeled and pointed. Leaves lanceolate to elliptical, mucronately obtuse to long-acuminate, 3-6.5x6-9 or 10 cm., wing-petioled for some 5-10 mm., 5-nerved, drying thin and orange. Spikes mostly solitary, long (50 mm. or more), with some 4 oblong joints about 40-flowered in 6 series: peduncle about 5 mm. long. Fruit yellow, round, nearly smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 228.

Venezuelan region.—The type from Venezuela.

Specimens examined:—VENEZUELA. Caracas (*Knoop*, iii b., 1905, the type).

PHORADENDRON CHRYSOCLADON A. Gray.

Phoradendron chrysocladon A. Gray, U. S. Explor. Exped. . . . Wilkes. vol. 15. pt. 1, Botany, Phanerogamia. p. 743. 1854.

P. flavum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 106. 1868,—as to Brazil.

P. flavens Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 116, for the most part. 1868.

Phoradendrum reticulatum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 12. 1897.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, drying yellow, androgynous?. Internodes moderate (2-5x40-80 mm.), minutely cellular-papillate, the upper ancipital or 2-edged. Cataphyls a single pair about 5 mm. above the base, or several on the lowermost joint, very short and broad, keeled and pointed. Leaves round-ovate, acuminate and often recurved at tip, 3-4x5-7 cm., rather abruptly wing-petioled for 5-10 mm. Spikes mostly solitary, moderate to long (20-30, lengthening to 50-80 mm. in fruit), with 3-8 oblong joints

20- to 30-flowered in 4+2 or 6 series: peduncle about 3 mm. long, often followed by a sterile joint: scales forming rather large funnel-shaped tubes. Fruit round-ovoid, nearly smooth, 4 mm. in diameter: sepals closely inflexed.—Plates 229, 230.

Brazilian region (? exclusively) on *Tapira*.—The type from Rio de Janeiro.

Specimens examined:—BRAZIL. Near Rio de Janeiro (*Wilkes Exped.*, 1838-42,—the type; *Riedel*). Villa Nova, near Rio de Janeiro (*Glaziou*, 7664, May 1874,—the type of *P. reticulatum*). Bahia (*Saltzmann*, 302).

***Phoradendron membranaceum* n. sp.**

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (2-3x50-80 mm.), striate, terete. Cataphyls nearly basal, broadly triangular, keeled and pointed. Leaves lanceolate to very broadly elliptical, acuminate at both ends, 5-7.5x10-13 cm., subpetioled for about 10 mm., 5-nerved, drying green and thin. Spikes mostly solitary, long (50, becoming 90 or 100 mm.), with half a dozen joints some 30-flowered in 6 series: peduncle 5 mm. long. Fruit (immature) subglobose, smooth, 3 mm. in diameter: sepals closely inflexed.—Plate 231.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. S. Miguel (*Sodirol*, 148/18, 1883,—the type). Naneg (*Sodirol*, e).

PHORADENDRON QUINQUENERVIUM Krause.

Phoradendron quinquenervium Krause, Notizbl. K. Bot. Gart. Dahlem. vol. 5. p. 264. 1912.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (2-5x40-60 mm.), rather granular, somewhat hexagonal or 2-edged above. Cataphyls a single pair, 5-10 mm. above the base, triangular, keeled and pointed. Leaves elliptical or lance-ovate, abruptly short-acuminate, 3-3.5x6-7 cm., abruptly subsessile. Spikes mostly solitary, rather long (40-60 mm.), with about 10 short rounded joints some 24-flowered in 6 series: peduncle almost suppressed. Fruit?—Plate 231.

Isthmian region.—The type from Costa Rica.

Specimens examined:—COSTA RICA. Juiz (*Tonduz*, 11457,—Nov. 1897,—the type).

Phoradendron supravenulosum n. sp.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous?. Internodes moderate (2-3x40-60 mm.), somewhat granular, more or less hexagonally lined above. Cataphyls a single pair, 5-10 mm. above the base, deltoid, keeled and pointed. Leaves obliquely broadly lanceolate, more or less acuminate pointed, 3-6x9-12 cm., rather gradually sessile, 5-nerved. Spikes mostly clustered, rather long (40-70 mm.), with about 10 short joints covered by some 24-40 flowers in 6 series: peduncle almost suppressed. Fruit (immature) apparently to be elongated and somewhat granular: sepals closely inflexed.—Plate 232.

Guatemalan and Isthmian regions on *Coffea*, *Piper*, *Siparuma*, etc.—The type from Guatemala.

Specimens examined:—GUATEMALA. Cubilquitz, Alta Verapaz (v. *Tuerckheim*, 7967, 8574, Aug. 1903—the type). NICARAGUA. Chontales (*Tate*, “129 (198),” 1867-8). COSTA RICA. Tucurrique (*Tonduz*, 12749). Without locality (*Endres*, 139).

PHORADENDRON FLAVENS Grisebach.

Phoradendron flavens Grisebach, Fl. Br. W. I. p. 313. 1860.

Viscum flavens Swartz, Prodr. Fl. Ind. Occ. p. 32. 1788.—de Candolle, Prodromus. vol. 4. p. 282.

V. macrophyllum Macfadyen, Fl. Jamaica. vol. 2. p. 195. 1850.

Phoradendrum flavens Urban, Bot. Jahrb. vol. 24. p. 50. 1897,—as to the Antilles.

More or less pseudodichotomous, the rather long branches with cataphyls on all joints, androgynous. Internodes moderate (3-5x40-80 mm.), granular, 2-keeled with decussate rotation at the nodes and cataphyls. Cataphyls 2 or 3 pairs on the lower third of the lowest joint, a single pair some 10 mm. above the base of the others, broadly triangular, keeled and pointed. Leaves more or less obliquely acuminate, 4-7x some 10-15 cm., cuneately subpetioled, 5- to 7-nerved. Spikes more or less clustered, rather long (20-35, lengthening to 60 mm.), with half a dozen rather short joints some 24-flowered in 6 series: peduncle almost suppressed, often followed by a sterile joint. Fruit yellow, ovoid, nearly smooth, 3x4 mm.: sepals closely inflexed.—Plate 233.

Antillean region (? exclusively) on *Guarea*.—The type from Jamaica.

Specimens examined:—ANTILLES. JAMAICA. (*McFadyen*,—the type of *V. macrophyllum*; *Purdie*; *Harris*, 6203; *Britton*, 180, 3968; *Watt*, 6219).

Phoradendron flavens australe n. var.

Differing from the type, as pointed out by Urban (Bot. Jahrb. vol. 24. p. 51.), in its 3- to 5-nerved leaves, nearly twice as numerous 12- to 20-flowered spike-joints, and rounder white berries.

Caribbean region (? exclusively) on *Inga*.—The type from St. Vincent.

Specimens examined:—CARIBBEES. DOMINICA (*Imray*, 216, 386; *Lloyd*, 208; *Eggers*, 661, 946). ST. VINCENT (*Eggers*, 6746,—the type; *Guilding*; *Smith*, 374). GRENADA (*Broadway*, 1019; *Eggers*, 6398). TRINIDAD (*Crueger*, 111, 2720; *Hooker herb.*).

Phoradendron trisulcatum n. sp.

More or less pseudodichotomous, the long branches with cataphyls on all joints, androgynous?. Internodes long (2.5x100 mm. or more), granular, somewhat ancipital. Cataphyls a nearly basal pair followed at some 30 mm. by a second on the lowest joint, a single pair 15-20 mm. above the base of the others, very broad, keeled and pointed. Leaves falcately lanceolate to round-elliptical, acute at both ends, 4.9x14-16 cm., wing-petioled for 10 mm., sulcately 3-nerved above. Spikes mostly solitary, moderate (20-30 mm.), with 4-7 joints some 18-flowered in 4+2 series: peduncle nearly suppressed. Fruit?—Plate 234.

Andean region.—The type from Ecuador.

Specimens examined:—ECUADOR. Mt. Chimborazo, at 2500-3000 ft. (*Spruce*, 6202, Aug. 1860,—the type).

PHORADENDRON URBANIANUM Ule.

Phoradendron Urbanianum Ule, Verhandl. Bot. Verein Prov. Brandenburg. vol. 48. p. 157. 1906.

Scarcely forked, drying olive, the moderate branches with cataphyls on all joints, dioecious?. Internodes moderate (2.4x40-60 mm.), somewhat granular, quickly terete, dilated below the nodes. Cataphyls a single pair about 5 mm. above the base, deltoid, keeled and pointed. Leaves elliptical-lanceolate, mucronately acuminate to obtuse, 5.7x8-13 cm., cuneately wing-petioled for about 10 mm. Spikes solitary, moderate (about 50 mm.), with about 4 oblong joints some 30-flowered in 6 series: peduncle somewhat granular, 3x4 mm. Fruit?—Plate 234.

Andean region.—The type from Peru.

Specimens examined:—PERU. Cerro de Escaler (*Ule*, 6681,—the type).

PHORADENDRON LINDAVIANUM Patschovsky.

Phoradendron Lindavianum Patschovsky, Bot. Jahrb. vol. 45. p. 438. 1911.

Scarcely forked, drying golden yellow, the long thick branches with cataphyls on all joints, dioecious. Internodes long (3-8x100-125 mm.), granular, somewhat hexagonally flattened, dilated below the nodes. Cataphyls a single pair, about 10 mm. above the base, deltoid, keeled and pointed. Leaves elliptical-ovate, more or less mucronately obtuse to emarginate, 4x9 to 10x15 cm., cuneately wing-petioled for 10 mm. Spikes solitary, very long (60 to over 100 mm.), with about 4 thick cylindrical joints often over 100-flowered in about 8 (6-10) series: peduncle granular, 5-10 mm. long. Fruit (immature) elongated, nearly smooth, 3x5 mm.: sepals closely inflexed.—Plate 235.

Andean region (? exclusively) on *Aralia*.—The type from Peru.

Specimens examined:—PERU. Catani, between Sandia and Chunchusmayo (*Weberbauer*, 1288, July 25, 1902,—the type). Cucharo (*Poeppig*, 1829-30, in the Vienna herbarium).

IV. DICHOTOMAE.

Normally forking at every node, the branches therefore not percurrent though sometimes ending in a flower-spike.

Leaves basinerved.

Venulose above, obscurely nerved beneath.

HUALLAGENSES.

Equally nerved and veiny on both sides, or opaque.

Small.

GARDNERIANAE.

Moderate or large.

Coriaceous or moderately thin.

With terminal spikes in the forks.

CYMOSE.

Not cymose.

P. Jenmani.

Very large and thick, dimidiate.

P. obliquum.

Leaves penninerved.

Thick and flat.

Obscurely nerved.

P. Northropiae.

Evanescently heavy-nerved.

P. Eggersii.

Chartaceous, veiny, often revolute.

P. racemosum.

54. HUALLAGENSES.

Leaves moderate, acuminate ovate-lanceolate, drying rather thin with the lower surface smooth but heavily basinerved and the upper reticulately veiny and more or less venulose. Shoots terete. Cataphyls typically a single pair, nearly basal on all joints,—the branches being sometimes percurrent, and sometimes cymosely dichotomous, and rarely without cataphyls on some joints. Flowers in 2 or 4 series. Fruit ovoid, rather rough, with nearly closed sepals. South America.

Spikes short (20-30 mm.), with short joints.

P. huallagense.

Spikes long (50 mm.), with long joints.

P. laxiflorum.

PHORADENDRON HUALLAGENSE Ule.

Phoradendron huallagense Ule, Verhandl. Bot. Verein Prov. Brandenburg. vol. 48. p. 158. 1906.

Cymosely dichotomous, the moderately long slender branches therefore with cataphyls on all joints, dioecious?. Internodes moderate (2x 40-60 mm.), striate rather than granular, nearly terete but somewhat dilated below the nodes. Cataphyls a single nearly basal pair, triangular, pointed. Leaves ovate-lanceolate, mucronately acuminate to very obtuse, 2-2.5x5-6 cm., cuneately subsessile. Spikes solitary, short (10, scarcely lengthening to 30 mm.), with about 4 short joints 4-flowered about the middle when pistillate; peduncle scarcely 2 mm. long. Fruit white, elongated, granular-roughened, 2x4 mm.: sepals erect, somewhat parted.—Plate 237.

Andean region.—The type from Peru.

Specimens examined:—PERU. Huallaga, Loreto (*Ule*, 6664,—the type).

PHORADENDRON LAXIFLORUM Ule.

Phoradendron laxiflorum Ule, Verhandl. Bot. Verein Prov. Brandenburg. vol. 48. p. 158. 1906.

More or less pseudodichotomous or exceptionally cymosely forked, the long slender branches with varying cataphyls, dioecious?. Internodes rather long (2x30-70 mm.), granular, nearly terete but somewhat dilated below the nodes. Cataphyls typically a single nearly basal pair, exceptionally 3 pairs, and on one shoot absent from two internodes, triangular, keeled and pointed. Leaves ovate-lanceolate, aristately acuminate, 2.5-3x 5-7 cm., rather abruptly wing-petioled for scarcely 5 mm. Spikes solitary, rather long (25, lengthening to 40-50 mm.), with about 5 very slender joints some 10 mm. long 2-flowered near the top when pistillate: peduncle some 3 mm. long, with a pair of scales toward the base. Fruit (immature) subellipsoid, nearly smooth, 3x5 mm.: sepals erect, nearly meeting.—Plate 236.

Brazilian region.—The type from Amazonas.

Specimens examined:—BRAZIL. Sta. Clara, Jurua, Amazonas (*Ule*, 5251, Oct. 1900,—the type).

55. CYMOSAE.

Leaves often comparatively large, drying thin and distinctly palmately fine-nerved. Shoots ancipital or terete. Branching cymosely dichotomous, each internode being succeeded by a spike and 2 axillary branches, so that all joints are really basal and hence with 1 or usually 2 pairs of cataphyls. Flowers mostly in 6 series. Fruit round, nearly

smooth, with closed sepals. South America, the Galapagos Islands, and the West Indies.

Spikes slender: leaves broadly lanceolate.

P. dichotomum.

Spikes moderate.

Leaves broad (1:2).

Round-obovate.

Spike-joints turbinate.

P. cymosum.

Spike-joints oblong.

P. galapageium.

Broadly lanceolate or ovate.

P. Henslovii.

Leaves elongated (1:5).

P. uncinatum.

Spikes stout.

Leaves elongated.

Lanceolate.

P. campinense.

Lance-oblong, thick.

P. Holtonis.

Leaves orbicular.

P. Lindenii.

PHORADENDRON DICHOTOMUM (Krug & Urban).

Viscum dichotomum Bertero in Sprengel, Syst. vol. 1. p. 488. 1825.

Viscum Berterianum de Candolle, Prodrum. vol. 4. p. 281. 1830.

Phoradendron Berterianum Eichler in v. Martius, Fl. Brasil. vol. 5. pt. 2. p. 127. 1868.

P. Giordanae Warburg, Tropenpflanzer. vol. 9. p. 635. 1905,—name only.

Phoradendrum dichotomum Krug & Urban, Bot. Jahrb. vol. 24. p. 48. 1897.

Forked at every node, sometimes with a terminal spike, the rather long slender branches therefore with cataphyls on all joints, androgynous. Internodes rather long (1-3x30-80 mm.), the upper transiently more or less rhombically compressed. Cataphyls a nearly basal pair followed at 10-20 mm. by a second, exceptionally a third pair interposed, not tubular, acute, white-margined. Leaves lanceolate, mucronately subacute, 2-3x6-9 or even 5x12 cm., cuneately subpetioled for scarcely 5 mm. Spikes mostly solitary, long (40-75 mm.), with about 4 slender joints some 18- to 40-flowered in 4+2 series: peduncle 2 mm. long, followed by a sterile joint: scales scarcely ciliate. Fruit white, round, nearly smooth, 4 mm. in diameter: sepals inflexed.—Plates 237, 238, 239.

Antillean region on *Mangifera*, *Petitia*, *Trichilia*, etc.—The type from Santo Domingo.

Specimens examined:—ANTILLES. CUBA (*Wright*, 216, 437, 1251; *Shafer*, 8817). PUERTO RICO (*Sintenis*, 2345b, 2348, 3058, 4288, 6114, 6419). HAITI (*Buch*, 454; *Christ*, 2096; *Picarda*, 215; *Nash*, 633; *Nash & Taylor*, 1151). STO. DOMINGO (*Bertero*, 710,—the type of *V. dichotomum*, from Sprengel in the Presl herbarium; *Bertero*, 1821,—the type of *V. Berterianum*; *Poiteau*, 617, 1802; *Wright*, *Parry & Brummel*, 464).

An extreme with round-ovate leaves 5-6x7-10 cm., is var. *ovatifolia*,—*Phoradendrum dichotomum ovatifolium*, Krug & Urban, l. c. p. 49, from Sto. Domingo (*Eggers*, 1845).—Plate 239.

PHORADENDRON CYMOSUM (Urban).

Phoradendrum cymosum Urban, Bot. Jahrb. vol. 23. Beibl. 57. p. 7. 1897.

Cymosely dichotomous, the moderate branches therefore with cataphyls on all joints, androgynous. Internodes moderate (2-3x40-60 mm.), the upper transiently more or less rhombically compressed. Cataphyls a nearly basal pair, often followed at some 20 mm. by a second pair, somewhat tubular, white-margined. Leaves round-elliptical, obtuse or subemarginate, 2-3.5x4-6 cm., gradually subpetiolately contracted for about 5 mm. Spikes mostly solitary, moderate (30, becoming 60 mm. in fruit), with half a dozen fusiform joints rather turbinate some 30-flowered in 4+2 or 6 series: peduncle 3 mm. long: scales scarcely ciliate. Fruit (immature) white, subglobose, slightly low-granular, 3-4 mm. in diameter: sepals inflexed.—Plate 240.

Venezuelan region on *Persea* etc.—The type from Venezuela.

Specimens examined:—VENEZUELA. Caracas (*Gollmer*, Jan. 1856,—the type).

PHORADENDRON GALAPAGEIUM Robinson.

Phoradendron galapageium Robinson, Proc. Amer. Acad. vol. 38. p. 133. 1902.

Viscum galapageium Hooker f., Trans. Linn. Soc. vol. 20. p. 216. 1845.

Cymosely dichotomous, the moderate branches therefore with cataphyls on all joints, androgynous?. Internodes rather long (2-3x50-100 mm.), nearly terete. Cataphyls a nearly basal pair followed at 5-35 mm. by a second pair, scarcely tubular, white-margined. Leaves obovate to sublanceolate, mucronate, very obtuse to subacute, 1.5-3x3-4 cm., cuneately subpetioled for about 5 mm. Spikes (immature) rather short (25-30 mm.), with about 5 short plump joints some 20-flowered in 4+2 or 6 series: peduncle scarcely 2 mm. long. Fruit?—Plate 241.

Galapageian region.—The type from Chatham Island.

Not seen in any recognizable specimens,—the description based on the original account and the photograph of the type here reproduced.

PHORADENDRON HENSLOVII Robinson.

Phoradendron Henslovii Robinson, Proc. Amer. Acad. vol. 38. p. 133. 1902.

Viscum Henslovii Hooker f., Trans. Linn. Soc. vol. 20. p. 216. 1845.

?*V. florianum* Andersson, Handl. Akad. Stockholm. 1853. p. 92.

?*P. florianum* Robinson, l. c. 1902.

Cymosely dichotomous, the moderate branches therefore with cataphyls on all joints, androgynous?. Internodes rather long (2-3x50-80 or 150 mm.), nearly terete. Cataphyls a nearly basal pair followed at 5-15 or even 30 or 40 mm. by a second pair, scarcely tubular, white-margined. Leaves ovate to broadly lanceolate, mucronate, very obtuse to subacute, 2.5-4x4-10 cm., rather abruptly petioled for 5 mm. Spikes more or less clustered, long (50-70 mm.), with some half-dozen fusiform joints turbinate about 30-flowered in 4+2 or 6 series: peduncle scarcely 5 mm. long. Fruit (immature) subglobose, somewhat low-granular, 3 mm. in diameter: sepals inflexed.—Plates 242, 243.

Galapageian region.—The type from Charles Island.

Specimens examined:—GALAPAGOS ISLANDS. CHATHAM (*Steindachner*, 67; *Bauer*, 286). ABINGDON (*Snodgrass & Heller*, 825). ALBEMARLE (*Snodgrass & Heller*, 40, 228). INDEFATIGABLE (*Habel*, 1860).

PHORADENDRON UNCINATUM Robinson.

Phoradendron uncinatum Robinson, Proc. Amer. Acad. vol. 38. p. 134. pl. 1. 1902.

Cymosely dichotomous, the elongated branches with cataphyls on all joints, androgynous?. Internodes rather long (2-3x50-80 mm.), essentially terete. Cataphyls a pair nearly basal or as much as 10 mm. above the base, often followed by a second pair some 30 mm. higher, scarcely tubular and but little scarious. Leaves lanceolate, acute, 1-1.5x6-7 cm., cuneately subpetioled for about 5 mm., (normally?) hooked at apex. Spikes mostly solitary, long (70-80 mm.), with about 7 slightly fusiform joints turbinate some 30-flowered in 4+2 or 6 series: peduncle 2 mm. long: scales scarcely ciliate. Fruit (immature) subglobose, nearly smooth, 3 mm. in diameter: sepals inflexed.—Plate 243.

Galapageian region.—The type from South Narborough Island.

Specimens examined:—GALAPAGOS ISLANDS. SOUTH NARBOROUGH, at 1000-2000 ft. altitude (*Snodgrass & Heller*, 325, Apr. 1899,—the type).

Phoradendron campinense n. sp.

Cymosely dichotomous, the elongated branches therefore with cataphyls on all joints, androgynous?. Internodes long (2-3x70-100 mm.), quickly terete. Cataphyls a nearly basal pair followed by a second pair some 15-25 mm. higher, tubular-bifid, rather blunt and white-margined. Leaves somewhat falcately or dimidiately lanceolate, acute, 1.5-2.5x6-10 cm., involutely contracted for scarcely 5 mm. rather than petioled, thick and indistinctly nerved. Spikes more or less clustered, very long (at

length 100 mm.), with some 7 stout oblong joints about 50-flowered in 6 series: peduncle 5 mm. long, usually with a basal pair of scales. Fruit (immature) subglobose: sepals inflexed.—Plate 244.

Brazilian region.—The type from Campinas.

Specimens examined:—BRAZIL. Campinas (*de Campos Novaes*, 417 in part,—the type).

Phoradendron Holtonis n. sp.

Cymosely dichotomous, the rather elongated branches therefore with cataphyls on all joints, androgynous?. Internodes rather long (2-4x 60-100 mm.), at first rhombic. Cataphyls a nearly basal pair followed by a second pair 20-25 mm. higher, tubular, blunt and somewhat white-margined. Leaves somewhat falcately lanceolate, obtuse, 2.5-3x8 cm., involutely subsessile. Spikes mostly solitary, very long (60-100 mm.), with some 4 fusiformly thickened joints turbinate 40- to 50-flowered in 6 series: peduncle 3 mm. long. Fruit (immature) subglobose, nearly smooth, 4 mm. in diameter: sepals inflexed.—Plate 244.

Andean region.—The type from Colombia.

Specimens examined:—COLOMBIA. Fusagasuga (*I. F. Holton*, 655,—the type, and probably also 654).

Phoradendron Lindeni n. sp.

Cymosely dichotomous, the rather long slender branches therefore with cataphyls on all joints, androgynous?. Internodes long (2-3x50-100 mm.), quickly terete. Cataphyls a single nearly basal pair, scarcely tubular, acute, white-margined. Leaves orbicular to obovate, obtuse or emarginate, about 5x6 cm., abruptly narrowed to a petiole 3 mm. long. Spikes mostly solitary, rather long (60 mm. or more), with 4 or 5 stout cylindrical joints some 50-flowered in about 8 series: peduncle 3-4 mm. long. Fruit?—Plate 245.

Andean region (? exclusively) on *Capparis*.—The type from Colombia.

Specimens examined:—COLOMBIA. Espinal. Valley of the Magdalena (*Linden*, 846, Dec. 1842,—the type).

EXPLANATION OF PLATES

All of the figures, unless otherwise noted, are from herbarium material, photographed in natural size by the author. Though it has not been possible always to do so, an effort has been made to include in each illustration the lower part of a basal internode so as to show the presence or absence of cataphyls; and except for types of the older species a representative specimen rather than a perfect one has been selected for the photograph when possible. The upper figure of a plate is designated by "a," and the lower by "b." Where no indication is given, it is to be understood that the material figured is at the Missouri Botanical Garden in St. Louis, or at the University of Illinois in Urbana,—the facilities of these institutions having been the main resource of the author in the preparation of manuscript.

FRONTISPIECE. DISTRIBUTION MAP, showing the principal regions indicated by the genus *Phoradendron*.

North America: (1) Atlantic region, approximately that drained by the Mississippi river and the eastern streams, occupied by *Phoradendron* only south of the Ohio and Missouri rivers; (2) Rocky Mountain region, occupied by *Phoradendron* only in its southern part which is scarcely more than a northern Chihuahuan extension; (3) Californian region, reaching Oregon; (4) Sonoran or desert region, essentially the valley of the lower Colorado river with the coasts and islands of the gulf of Baja California; (5) Chihuahuan region, connecting the Rocky Mountains with the eastern and western Sierra Madre ranges of Mexico; (6) Mexican table-land, lying between the Sierra Madre ranges and passing into the southern Chihuahuan region; (7) Sierra Madre ranges, confluent into (8) the Cordilleran or Guatemalan region, which itself passes into (9) the Isthmian or Costa Rican region, reaching from Costa Rica into coastwise Venezuela; (10) Yucatecan region.

South America: (11) Andean region, of great extent in the mountains, meeting the Isthmian region in Venezuela; (12) Bolivian region, comprising the uplands of southwestern Bolivia and northwestern Argentina; (13) La Plata region,—no *Phoradendron* known from south of Uruguay; (14) Brazilian upland or southern Brazilian region, limited in general by the valleys of the Amazon and Paraguay rivers; (15) Amazonian region; (16) Cayenne region, lying between

the drainage of the Orinoco and Amazon rivers; (17) Orinocan region, like the Amazonian appearing as a barrier to distribution rather than a distributional region for *Phoradendron*; (18) Venezuelan region, a meeting point of the Isthmian, Andean and Caribbean regions; (19) Galapageian region, essentially an oceanic extension of the Venezuelan and Andean regions.

West Indies: (20) Caribbean region, as far north as the Anegada passage; (21) Antillean region; (22) Bahamian region, in *Phoradendron* showing absolute isolation from the adjacent Atlantic region of Florida.

Plate 1. HABIT. *Phoradendron villosum*, on *Quercus*. Photographed in California by George E. Nichols. Greatly reduced.

Plate 2. HABIT. *Phoradendron Libocedri*, on *Libocedrus*, at the entrance to the Yosemite valley, California. Photographed by George D. Fuller. *P. juniperinum*, on *Juniperus*, at the rim of the grand cañon, Arizona. Photographed by Charles F. Hottes. Both greatly reduced.

Plate 3. MORPHOLOGY of foliage in the Aphyllae. a. *Phoradendron juniperinum*, with scales not constricted at the base (*Wright*). b. *P. ligatum*, with scales constricted at the base (Oregon, *Cusick*,—the type). $\times 10$.

Plate 4. MORPHOLOGY of the Aphyllae. *Phoradendron juniperinum*, showing scale-like leaves, fruiting spikes each of a single 2-flowered joint, and globose berry-like fruit with parted sepals (Arizona, *Griffiths*,—from fresh material). $\times 5$.

Plate 5. MORPHOLOGY of spikes in the Flavescentes.

a. Staminate spikes of (from left to right) *Phoradendron flavesces* (Missouri, *Eggert*), *P. flavesces orbiculatum* (northern Texas, *Bush*), *P. macrotomum* (Florida, *Curtiss*), *P. Engelmanni* (southern Texas, *Lindheimer*), *P. Engelmanni Claviger* (southern Texas, *Trelease*), *P. villosum* (Oregon, *Engelmann*), *P. Cockerellii*, (New Mexico, *Metcalf*), *P. macrophyllum* (Arizona, *Gilbert*), and *P. Coryae* (Arizona, *Blumer*). All $\times 3$.

b. Pistillate spikes of (from left to right) *Phoradendron flavesces* (Virginia?, *Curtiss*), *P. macrotomum* (Florida, *Curtiss*), *P. Engelmanni* (southern Texas, *Lindheimer*), *P. villosum*, in fruit (Oregon, *Howell*), *P. Cockerellii* (New Mexico, *Metcalf*), *P. macrophyllum* (Arizona, *Blumer*), and *P. Coryae* (Arizona, *Thornber*). All $\times 3$.

Plate 6. MORPHOLOGY of spikes. a. *Phoradendron Libocedri*, one of the Pauciflorae, showing an entire 1-jointed 2-flowered spike, with parted fruiting sepals. b. *Phoradendron villosum*, one of the Pluriseriales, showing one joint of a 3-jointed spike with flowers in several series, with parted fruiting sepals. Both in fruit, and x 10.

Plate 7. MORPHOLOGY of flowers. a. *Phoradendron macrophyllum*, a joint of a staminate spike with 2- and 3-merous flowers (Arizona, *Blumer*). b. *P. villosum*, an entire pistillate spike with 3- and 5-merous flowers (California, *Hedgcock*). c. *P. macrophyllum*, a joint of a staminate spike showing 3-, 4- and 5-merous flowers (Arizona, *Blumer*). All x 10.

Plate 8. FRUITING CALYX with inflexed sepals. a. *Phoradendron californicum* (Arizona, *Miss Cory*). b. *P. nervosum* (Mexico, *Purpus*). Both x 10.

Plate 9. FRUITING CALYX with parted sepals. a. *Phoradendron macrophyllum* (Arizona, *Blumer*). b. *P. Zuloagae* (Venezuela, *Zuloaga*). c. *P. Coryae* (Arizona, *Miss Cory*). All x 10.

Plate 10. ENDOCARP. a. *Phoradendron Coryae* (Arizona, *Miss Cory*). b. *P. villosum* (California, *Butler*). c. *P. macrophyllum* (Arizona, *Blumer*). All x 10.

Plate 11. PHORADENDRON CALIFORNICUM. a. Four bits of the type (Sierra Nevada, *Nuttall*, 1836); Sonora (*Palmer*, 1065). b. Fruiting plant (California, *Jones*, 11718).

Plate 12. PHORADENDRON CALIFORNICUM NANUM. Type (Arizona, *Griffiths and Thornber*, 205).

Plate 13. PHORADENDRON CALIFORNICUM DISTANS. a. The type (Arizona, *Pringle*, 1881). b. Fruiting branch (Nevada, *Kennedy and Goodding*, 57).

Plate 14. PHORADENDRON JUNIPERINUM. a. The type (New Mexico, *Fendler*, 281). b. Type of f. NANA (Arizona, *Sitgreaves*, 1851).

Plate 15. a. PHORADENDRON LIBOCEDRI. Type (California, *Lemon*, 1875). b. *P. ligatum*. Oregon (*Cusick*, 2637).

Plate 16. a. PHORADENDRON MINUTIFOLIUM. Type (Mexico, *Schiede*, 402); photographed by permission at Dahlem. b. *P. saltillense*. Type (Mexico, *Gregg*, 399).

Plate 17. PHORADENDRON CAPITELLATUM. Type (New Mexico, *Wright*, 1787); photographed by permission at the New York Botanical Garden.

Plate 18. PHORADENDRON TEQUILENSE. Type: a, pistillate; b, staminate (Mexico, *Pringle*, 4434).

Plate 19. PHORADENDRON BOLLEANUM. a. Fragment of type (Mexico, *Seemann*), and branch of collection by Pringle, no. 256, of which other specimens are shown in b.

Plate 20. PHORADENDRON DENSUM. a. Type (California, *Wilkes Expedition*, 1567); photographed by permission at the New York Botanical Garden. b. An Oregon specimen (*Cusick*, 2260).

Plate 21. PHORADENDRON DENSUM PARISHII. Type (California, *Parish*, 899).

Plate 22. a. PHORADENDRON PAUCIFLORUM. Type (California, *Bigelow*, 2); photographed by permission at the New York Botanical Garden. b. P. GUADALUPENSE. Type number (Guadalupe Island, *Palmer*, 85); photographed by permission in the Boissier herbarium.

Plate 23. PHORADENDRON GUADALUPENSE. Type (Guadalupe Island, *Palmer*, 85).

Plate 24. PHORADENDRON FLAVESCENS. a. Staminate shoot (Missouri, *Eggert*). b. Pistillate shoots, bearing flowers of the present season and mature fruit from flowers of the previous autumn (Fresh material from North Carolina, *Coker*, 1911).

Plate 25. PHORADENDRON FLAVESCENS. Two pistillate specimens. a. *Viscum purpureum* of Willdenow, but not of Linnaeus (Pennsylvania, *Muhlenberg*, 639,—as no. 18295 in the Willdenow herbarium); photographed by permission at Dahlem. b. *Viscum serotinum* Rafinesque (Arkansas, *Rafinesque*); photographed by permission in the Delessert herbarium at Geneva.

Plate 26. PHORADENDRON FLAVESCENS ORBICULATUM. a. A staminate shoot (Texas, *Bush*, 1160). b. Pistillate specimens with flowers and ripened fruit (Fresh material from Arkansas, *von Schrenk*, 1912).

Plate 27. PHORADENDRON MACROTOMUM. Staminate and pistillate flowering shoots, and mature fruit from flowers of the previous season (Fresh material from Florida, *Schnabel*, 1911).

Plate 28. PHORADENDRON EATONI. Type, staminate (Florida, *Eaton*, 1310); photographed by permission at the New York Botanical Garden.

Plate 29. PHORADENDRON ENGELMANNI. a. The type, staminate (Texas, *Lindheimer*, 406). b. A pistillate specimen (Texas, *Jerry*).

Plate 30. PHORADENDRON ENGELMANNI. Staminate and pistillate flowering specimens, and fruit from flowers of the previous winter (Fresh material from Texas, *Heald*, 1911).

Plate 31. a. PHORADENDRON ENGELMANNI. Staminate and fruiting specimens (Texas, *Jermy*). b. P. ENGELMANNI CLAVIGER, the type (Texas, *Trelease*, 1897).

Plate 32. PHORADENDRON GREGGII. Types. a, staminate (Mexico, *Gregg*, 254); b, pistillate (Mexico, *Gregg*, 31).

Plate 33. a. PHORADENDRON THYRSOIDEUM. The type (Mexico, *Palmer*, 103). b. P. COLIPENSE. The type, staminate, (Mexico, *Liebmann*, 8); photographed by permission in the herbarium at Copenhagen.

Plate 34. PHORADENDRON MACROPHYLLUM; a, staminate; b, pistillate (Arizona, *Blumer*, 1533).

Plate 35. a. PHORADENDRON MACROPHYLLUM CIRCULARE. Type, pistillate (Arizona, *Griffiths & Thornber*, 191). b. P. MACROPHYLLUM JONESII. Type, pistillate (Arizona, *Jones*, 4279); photographed by permission in the Delessert herbarium at Geneva).

Plate 36. PHORADENDRON COCKERELLI. a. Type, staminate (New Mexico, *Metcalf*, 31). b. Pistillate specimen (New Mexican region, *Wright*, 15).

Plate 37. PHORADENDRON COLORADENSE. a, staminate; b, pistillate (California, *du Barry*, 1855); photographed by permission at the New York Botanical Garden.

Plate 38. PHORADENDRON LONGISPICUM, staminate. a. The type (California, *Wilkes Expedition*, 1316,—as *P. flavescens quinque-nervium* Torrey in herb.) b. Another shoot (California, *Hasse*, 1893). Both photographed by permission at the New York Botanical Garden.

Plate 39. PHORADENDRON LONGISPICUM, pistillate. a, Shortly after flowering, showing the temporary clavate thickening of the spike-joints (California, *Abrams*, 2749); photographed by permission at the New York Botanical Garden. b, At maturity (Fresh material, California, *Griffiths*, 1912).

Plate 40. PHORADENDRON VILLOSUM. a. Type, staminate (Oregon, *Nuttall*, 1834). b. Pistillate specimen (Oregon, *Howell*, 1264).

Plate 41. a. PHORADENDRON VILLOSUM ROTUNDFOLIUM. The type, pistillate (California, *Elmer*, 3794). b. P. TOMENTOSUM. Fruiting specimen (Mexico, *Palmer*, 777).

Plate 42. PHORADENDRON TOMENTOSUM. The type (Mexico, *Berlandier*, 1364). a, staminate. b, pistillate, photographed for M. C. de Candolle, in the Candolleian herbarium at Geneva.

Plate 43. a. PHORADENDRON PUBERULUM. The type (Mexico, *Gregg*, 895). b. P. PUBERULUM CHIHUAHUENSE. The type (Mexico, *Endlich*, 1220).

Plate 44. PHORADENDRON CORYAE. a. The type, staminate (Arizona, *Blumer*, 1516). b. A fruiting specimen (Fresh material, Arizona, *Miss Kate T. Cory*, to whom the species is dedicated, 1912).

Plate 45. a. PHORADENDRON HAVARDIANUM. The type, staminate (Texas, *Havard*, 82). b. P. WILKINSONI. The type, staminate (Mexico, *Wilkinson*, 1885); photographed by permission in the U. S. National Herbarium.

Plate 46. a. PHORADENDRON LANATUM. The type, pistillate (Mexico, *Rose, Painter and Rose*, 9707); photographed by permission in the U. S. National Herbarium. b. P. GALEOTTII. The type, pistillate (Mexico, *Galeotti*, 2694); photographed by permission in the Delessert herbarium at Geneva).

Plate 47. a. PHORADENDRON PALMERI. The type, pistillate (Mexico, *Palmer*, 119). b. P. EDUARDI. The type, pistillate (Mexico, *Palmer*, 882).

Plate 48. a. PHORADENDRON MAZATLANUM. The type, pistillate (Mexico, *Gregg*, 1202). b. P. BRACHYSTACHYUM. The type, as also of *Viscum brachystachyum* (Mexico, *Berlandier*); photographed by permission in the Delessert herbarium at Geneva.

Plate 49. PHORADENDRON BRACHYSTACHYUM. Two divergent staminate forms. a (Mexico, *Pringle*, 1160); b (Mexico, *Pringle*, 6759); photographed by permission in the New York Botanical Garden.

Plate 50. PHORADENDRON TLACOLULENSE. a. Type (Mexico, *Seler*, 119). b. Another specimen (Mexico, *Seler*, 1763). Both photographed by permission in the herbarium at Dahlem.

Plate 51. PHORADENDRON GLOBULIFERUM. The type (Mexico, *Palmer*, 88); photographed by permission in the U. S. National Herbarium.

Plate 52. PHORADENDRON AUREUM. The type (Mexico, *Rose*, 16848); photographed by permission in the U. S. National Herbarium.

Plate 53. a. PHORADENDRON BRACHYPHYLLUM. The type (Mexico, *Rose*, 16293). b. P. TUMIDUM. The type (Mexico, *Rose*, 16862). Both photographed by permission in the U. S. National Herbarium.

Plate 54. P. DIGUETII. The type (Mexico, *Diguet*, 1894); photographed for M. Lecomte, in the herbarium of the Muséum d'Histoire Naturelle at Paris.

Plate 55. a. PHORADENDRON PENINSULARE. The type (Mexico, *Rose*, 16354). b. P. SACCATUM. The type (Mexico, *Rose*, 16562). Both photographed by permission in the U. S. National Herbarium.

Plate 56. PHORADENDRON ROBINSONII. The type, staminate (Mexico, *Pringle*, 6272).

Plate 57. a. PHORADENDRON ROBINSONII. Fruiting specimen (Mexico, *Rose & Hay*, 5939). b. P. ROBINSONII HINDSI (Mexico, *Hinds*, 1841); photographed by permission at Kew.

Plate 58. PHORADENDRON VELUTINUM. a. Type of *Viscum velutinum*, staminate (Mexico, *Berlandier*, 1158); photographed by permission in the Delessert herbarium at Geneva. b. A pistillate specimen (Mexico, *Pringle*, 9509).

Plate 59. PHORADENDRON SCABERRIMUM. a. The type, pistillate (Mexico, *Rose*, 3409). b. A second specimen (Mexico, *Rose*, 1712). Both photographed by permission in the U. S. National Herbarium.

Plate 60. PHORADENDRON LONGIFOLIUM. The type (Mexico, *Karwinski*, 1833); photographed in the Brussels herbarium for Professor Bommer.

Plate 61. PHORADENDRON USPANTANUM. The type (Guatemala, *Heyde & Lux*, 3141).

Plate 62. PHORADENDRON CALYCVLATUM. The type collection of *Viscum falcatum* Hooker, staminate (Mexico, *Galeotti*, 2696); photographed in the Brussels herbarium for Professor Bommer.

Plate 63. PHORADENDRON CALYCVLATUM. A pistillate specimen (Mexico, *Pringle*, 4699).

Plate 64. a. PHORADENDRON CALYCVLATUM FILIPES. The type, staminate (Mexico, *Purpus*, 6279); photographed by permission at the New York Botanical Garden. b. P. CALYCVLATUM GONZALEZI. The type (Mexico, *Conzatti and Gonzalez*, 295); photographed by permission in the Gray herbarium at Cambridge.

Plate 65. PHORADENDRON ANNULATUM. a. The type, pistillate (Costa Rica, *Oersted*, 14); photographed by permission in the herbarium at Copenhagen. b. A specimen with young and matured fruit (Guatemala, *Smith*, 2610).

Plate 66. PHORADENDRON MULTIFLORUM. The type, staminate (Guatemala, *Kellerman*, 5154).

Plate 67. PHORADENDRON MULTIFLORUM. A pistillate specimen,—one branch deformed into a gall (Guatemala, *Kellerman*, 5155); pho-

tographed, like the preceding, by permission in the U. S. National Herbarium.

Plate 68. PHORADENDRON AMPLIFOLIUM. The type, pistillate (Mexico, *Nelson*, 2018); photographed by permission in the U. S. National Herbarium.

Plate 69. PHORADENDRON CARNEUM. Two pistillate specimens, one of them with matured fruit (Mexico; a, *Pringle*, 8647; b, *Pringle*, 2668).

Plate 70. a. PHORADENDRON PRINGLEI. The type (Mexico, *Pringle*, 6630). b. P. FORESTIERAE. The type (Mexico, *Pringle*, 6290). Both are with partly matured fruit.

Plate 71. a. PHORADENDRON PACHYARTHRON. The type, pistillate (Mexico, *Ehrenberg*, 1011); photographed by permission at Dahlem. b. P. SCHUMANNI. Broad-leaved specimen, pistillate (Mexico, *Seemann*, 2140); photographed by permission at Kew.

Plate 72. PHORADENDRON SCHUMANNI. The type: a, staminate; b, pistillate (Mexico, *Schumann*, 711); photographed by permission at Dahlem.

Plate 73. PHORADENDRON PURPUSI. The type, staminate (Mexico, *Purpus*, 1912).

Plate 74. PHORADENDRON NERVOSUM. a. The type (Mexico, *Liebmann*, 5=3090); photographed by permission at Copenhagen. b. A specimen illustrating the occurrence of 4- and 6-ranked fruits on joints of the same spike (Mexico, *Purpus*, 1912).

Plate 75. a. PHORADENDRON CONZATTII. The type (Mexico, *Conzatti & Gomez*, 2380). b. P. CONZATTII TECOMATLANA (Mexico, *Conzatti*, 1897). Both photographed by permission in the herbarium of the Field Museum at Chicago.

Plate 76. PHORADENDRON CONZATTII NOCHIXTLANENSE. a. staminate; b, pistillate (Mexico, *Conzatti & Gonzalez*, 1187). Photographed by permission in the Gray herbarium.

Plate 77. PHORADENDRON LANCEOLATUM. a. The type (Mexico, *Gregg*, 255). b. Partly fruited specimen (Mexico, *Thurber*, 865); photographed by permission in the Gray herbarium.

Plate 78. PHORADENDRON FALCATUM. The type (Mexico, *Schiede*, 403); photographed by permission at Dahlem.

Plate 79. PHORADENDRON ANGUSTIFOLIUM. Two specimens of the type collection (Peru, *Bonpland*, 3508); a, photographed by permis-

sion at Dahlem; b, the type, photographed by permission in the Natural History Museum at Paris.

Plate 80. PHORADENDRON PARIETARIOIDES. The type (Ecuador, *Sodi*ro, 148/20); photographed by permission at Dahlem.

Plate 81. PHORADENDRON CORYNARTHON. The type (Panama, *Wagner*, 1858); photographed by permission in the herbarium of the Academy at Munich.

Plate 82. PHORADENDRON TONDUZII. a. The type, pistillate (Guatemala, *Tond*uz, 12179); photographed by permission at the New York Botanical Garden. b. Staminate shoot (Guatemala?, *Friedrichsthal*, 1841); photographed by permission in the Gray herbarium.

Plate 83. PHORADENDRON COOPERI. The type, staminate (Costa Rica, *Cooper*, 5931); photographed by permission in the U. S. National Herbarium.

Plate 84. a. PHORADENDRON TUBULOSUM. The type (Venezuela, *Fendler*, 1106); photographed by permission at Dahlem. b. PHORADENDRON TRIANAE. The type collection (Colombia, *Triana*, 2778); photographed by permission in the de Candolle herbarium at Geneva.

Plate 85. PHORADENDRON SEMITERES. a. The type (Bolivia, *Buch* tien, 1411); photographed by permission at Dahlem. b. Fruiting specimen (Peru, *Pavon*); photographed by permission in the Boissier Herbarium at Chambésy.

Plate 86. PHORADENDRON VERLEYSENI. a. The type (Ecuador, *Verley*sen, 148*). b. A broader-leaved specimen (Ecuador, *Sodi*ro, 28). Both photographed by permission at Dahlem.

Plate 87. PHORADENDRON VERLEYSENI CHIMBOENSE. The type (Ecuador, *Sodi*ro, 148/19). b. P. GRANATICOLUM. The type (Venezuela, *Gollmer*, 1854). Both photographed by permission at Dahlem.

Plate 88. PHORADENDRON CASIMIRANUM. The type (Paraguay, *Balansa*, 3220); photographed by permission in the Boissier herbarium at Chambésy.

Plate 89. PHORADENDRON DIPTERUM. The type collection (Brazil, *Gardner*, 1672); photographed by permission in the herbarium of the Natural History Museum at Vienna.

Plate 90. PHORADENDRON MULTIFOVEOLATUM. The types: a, staminate; b, pistillate (Brazil, *von Martius*); photographed by permission in the herbarium at Munich.

Plate 91. a. PHORADENDRON HYPERICIFOLIUM. The type (Paraguay, *Kuntze*, 9); photographed by permission at Dahlem. b. P. DE-

MERARAE. The type (British Guiana, *Jenman*, 2546) ; photographed by permission at Kew.

Plate 92. PHORADENDRON TETRAPTERUM. a. The type (Jamaica, *Harris*, 6393) ; photographed by permission at Dahlem. b. A larger-leaved specimen (Puerto Rico, *Stevens & Hess*, 4887).

Plate 93. PHORADENDRON TOVARENSE. a. The type (Venezuela, *Fendler*, 1761) ; photographed by permission at Dahlem. b. A fruiting specimen (Venezuela, *Fendler*, 1110) ; photographed by permission in the Gray herbarium.

Plate 94. a. PHORADENDRON CRUSII. The type (Brazil, *Glaziou*, 22021) ; photographed by permission at Dahlem. b. P. AMPLEXICAULE. Type collection (Brazil, *Weddell*, 1858) ; photographed by permission in the de Candolle herbarium at Geneva.

Plate 95. PHORADENDRON AMPECTENS. The type (Ecuador, *Sodi-ro*, 148/21) ; photographed by permission in the herbaria at Dahlem and Buda Pest,—both of which contain a large representation of *Sodi-ro*'s collections.

Plate 96. a. PHORADENDRON GLAZIOVII. The type (Brazil, *Glaziou*, 4004) ; photographed by permission at Dahlem. b. P. TURBINISPICUM. The type (Colombia, *Triana*, 2777) ; photographed by permission in the de Candolle herbarium.

Plate 97. PHORADENDRON BREVIFOLIUM. a. The type (Mexico, *Liebmann*, 16) ; photographed by permission at Copenhagen. b. Specimen with developed pistillate spikes (Mexico, *Rose, Painter & Rose*, 9965) ; photographed by permission in the U. S. National Herbarium.

Plate 98. PHORADENDRON RONDELETIAE. a. The type (Guatemala, *von Tuerckheim*, ii. 2045) ; photographed by permission at the New York Botanical Garden. b. Another collection (Guatemala, *von Tuerckheim*, 435) ; photographed by permission in the Natural History Museum at Vienna.

Plate 99. a. PHORADENDRON VULCANICUM. The type (Guatemala, *Kellerman*, 4829). b. P. CRISPUM. The type (Costa Rica, *Pittier*, 14117). Both photographed by permission in the U. S. National Herbarium.

Plate 100. a. PHORADENDRON REICHENBACHIANUM. (Mexico, *Gregg*, 722). b. P. FALCIFOLIUM. The type (Guatemala, *von Tuerckheim*, ii. 2168) ; photographed by permission at the New York Botanical Garden.

Plate 101. PHORADENDRON ROBUSTISSIMUM. a. The type (Costa Rica, *Hoffmann*, 360); photographed by permission at Dahlem. b. A fruiting specimen (Costa Rica, *Tonduz*, 13705); photographed by permission in the U. S. National Herbarium.

Plate 102. PHORADENDRON ROBUSTISSIMUM SIMULANS. a. The type (El Salvador, *Renson*, 284); photographed by permission at the New York Botanical Garden. b. A fruiting specimen (Guatemala, *Kellerman*, 5100); photographed by permission in the U. S. National Herbarium.

Plate 103. PHORADENDRON CONGESTUM. The type (Brazil, *Gardner*, 3764); photographed in the herbarium at Brussels for Professor Charles Bommer.

Plate 104. a. PHORADENDRON CONGESTUM. A misnumbered cotype (Brazil, *Gardner*, "3765"); photographed by permission at Dahlem. b. P. CARIPENSE. The type (Brazil, *Spruce*, 140); photographed by permission at Munich.

Plate 105. PHORADENDRON HERBERT-SMITHII. The type (Colombia, *Smith*, 1283); photographed by permission,—a, at Dahlem, b, in the Delessert herbarium at Geneva.

Plate 106. a. PHORADENDRON EXIGUUM. The type (Colombia, *Smith*, 1281); photographed by permission in the Delessert herbarium at Geneva. b. PHORADENDRON STENOPHYLLUM. The type (Brazil, *Rose & Russell*, 19908); photographed by permission in the U. S. National Herbarium.

Plate 107. a. P. CORIACEUM. The type (Brazil, *von Martius*); photographed by permission at Munich. b. PHORADENDRON CORIACEUM QUINTENSE. The type (Brazil, *Glaziov*, 4010); photographed by permission at Dahlem.

Plate 108. PHORADENDRON ULOPHYLLUM. The type collection (Brazil, *Gaudichaud*: a, no. 573 at Dahlem; b, "no. 473," at Vienna); photographed by permission.

Plate 109. PHORADENDRON HABROSTACHYUM. The type (Brazil *von Martius*: a, staminate; b, pistillate); photographed by permission at Munich.

Plate 110. PHORADENDRON OVALIFOLIUM. a. The type (Venezuela, *Fendler*, 1108); photographed by permission at Dahlem. b. A fruiting cotype; photographed by permission in the Grisebach herbarium at Goettingen.

Plate 111. PHORADENDRON LONGIPETIOLATUM. a. The type (Venezuela, *Fendler 1762*) ; photographed by permission at Dahlem. b. Another specimen of the same collection ; photographed by permission in the Grisebach herbarium at Goettingen.

Plate 112. PHORADENDRON BILINEATUM. a. The type (Venezuela, *Fendler, 1811*) ; photographed by permission at Dahlem. b. Another specimen of the same collection ; photographed by permission in the Grisebach herbarium at Goettingen.

Plate 113. PHORADENDRON RIGIDUM. a. The type (Venezuela, *Fendler, 1105*) ; photographed by permission at Dahlem. b. A second specimen of the same collection, bearing spikes in the axils of some cataphyls ; photographed by permission in the Grisebach herbarium at Goettingen.

Plate 114. PHORADENDRON JENMANI. a. The type (British Guiana, *Jenman, 2541*). b. A second collection (British Guiana, *Jenman, 4678*). Both photographed by permission at Kew.

Plate 115. PHORADENDRON POLYGYNUM. Two specimens of a single collection (Venezuela, *Fendler, 1104*). Photographed by permission : a, at Kew ; b, in the Gray herbarium.

Plate 116. a. PHORADENDRON POLYGYNUM. Part of the type illustration of *Spiciviscum polygynum*. b. P. BRIQUETIANUM. The type (Colombia, *Linden, 796*) ; photographed by permission in the Delessert herbarium at Geneva.

Plate 117. PHORADENDRON OBLIQUUM. a. The type of the binomial (without precise data, *Haenke*, from the herbarium of the German University at Prag) ; photographed by permission at Dahlem. b. The type of *Viscum obliquum* (Peru, *Haenke*) ; photographed by permission in the National Museum at Prag.

Plate 118. PHORADENDRON DIMIDIATUM. The type collection of *Viscum dimidiatum* (Surinam, *Focke, 716*). Photographed by permission : a, at Dahlem, from the Utrecht herbarium ; b, at Kew.

Plate 119. PHORADENDRON PERROTTETII. a. The type of *Viscum Perrottetii* (French Guiana, *Perrottet, 228*). b. Another collection (French Guiana, *Leprieur, 1835*). Both photographed by permission in the Delessert herbarium at Geneva.

Plate 120. PHORADENDRON BATHYORYCTUM. a. The type collection (Brazil, *Gardner, 2626*) ; photographed by permission in the Natural History Museum at Vienna. b. Another collection (Brazil, *Kuntze, 3*) ; photographed by permission at Dahlem.

Plate 121. PHORADENDRON PELLUCIDULUM. The type collection (Brazil, *Spruce*, 3480); photographed by permission in the Natural History Museum at Vienna.

Plate 122. a. PHORADENDRON HOLOXANTHUM. The type collection (Brazil, *Sello*, 5847); photographed by permission at Dahlem. b. P. HOLOXANTHUM CORALLISPICUM. The type (Brazil, *Glaziou*, 8729); photographed by permission in the Delessert herbarium at Geneva.

Plate 123. a. PHORADENDRON NITIDUM. The type collection of *Viscum nitidum* (Brazil, *Gardner*, 436); photographed by permission in the Natural History Museum at Vienna. b. P. SELLOI. The type collection (Brazil, *Sello*, 122); photographed by permission at Dahlem.

Plate 124. a. PHORADENDRON CRASPEDOPHYLLUM. The type (Brazil, *Sello*, 155). b. P. CRASPEDOPHYLLOIDES. The type (Brazil, *Sello*, without number). Both photographed by permission at Dahlem.

Plate 125. PHORADENDRON OBTUSISSIMUM. a. The type collection of *Viscum obtusissimum* (Surinam, *Focke*, 1019); photographed by permission at Dahlem. b. A fruiting specimen from British Guiana (*Jenman*, 2539); photographed by permission at Kew.

Plate 126. PHORADENDRON ACINACIFOLIUM. The type collection (Brazil, *Gaudichaud*, 574). Photographed by permission: a, at Dahlem; b, under the number 874, in the Delessert herbarium at Geneva.

Plate 127. a. PHORADENDRON ACINACIFOLIUM. Fruiting specimen (Brazil, *Sello*, 597). b. P. REDUCTUM. The type (Paraguay, *Kuntze*, 15). Both photographed by permission at Dahlem.

Plate 128. PHORADENDRON WAWRAE. a. The type (Mexico, *Wawra*, 747); photographed by permission in the Natural History Museum at Vienna. b. A second collection (Mexico, *Bourgeau*, 1482); photographed by permission at Kew.

Plate 129. a. PHORADENDRON CHEIROCARPUM. The type (Guatemala, *von Tuerckheim*, 7661); photographed by permission in the Gray herbarium. b. P. DECUSSATUM. The type (Honduras, *Niederlein*, 95); photographed by permission at Dahlem.

Plate 130. PHORADENDRON VERNICOSUM. a. The type (Yucatan, *Greenman*, 440); photographed by permission in the Field Museum at Chicago. b. A younger specimen (Yucatan, *Gaumer*, 876).

Plate 131. PHORADENDRON FICI. The type (Jamaica, *Harris*, 9220); photographed by permission at Dahlem.

Plate 132. PHORADENDRON CAMPBELLII. a. The type (Jamaica, *Campbell*, 6398); photographed by permission at Dahlem. b. A spe-

cimen with partly grown fruit (Jamaica, *Britton*, 3765); photographed by permission at the New York Botanical Garden.

Plate 133. PHORADENDRON GRISEBACHIANUM. a. Taken as the type (Jamaica, *Harris*, 6341); photographed by permission at Dahlem. b. A second collection (Jamaica, *Crawford*, 783); photographed by permission at the New York Botanical Garden.

Plate 134. PHORADENDRON CHRYSOCARPUM. The type collection. a. (Puerto Rico, *Balbis*, *Bertero*), photographed by permission at Dahlem. b. (Puerto Rico, *Bertero*, 439 in part); photographed by permission in the National Museum at Prag.

Plate 135. a. PHORADENDRON ANCEPS. The type collection of *Viscum anceps* (Santo Domingo, *Bertero*, 439 in part,—from Sprengel); photographed by permission in the National Museum at Prag. b. P. HAITENSE. The type (Haiti, *Picarda*, 1666); photographed by permission at Dahlem.

Plate 136. PHORADENDRON HARTII. The type (Trinidad, *Hart*, 6101). b. A flowering specimen (Trinidad, *Lunt*, 6117). Both photographed by permission at Dahlem.

Plate 137. PHORADENDRON WATTII. The type (Jamaica, *Hitchcock*). Photographed at the Missouri Botanical Garden by Professor C. H. Thompson.

Plate 138. a. PHORADENDRON WATTII. A representative fruiting specimen (Jamaica, *Campbell*, 6401). b. P. WATTII PRODUCTUM. The type (Jamaica, *Harris*, 10188). Both photographed by permission at Dahlem.

Plate 139. PHORADENDRON HELLERI. The type collection (Puerto Rico, *Heller*, 6188). Photographed by permission: a, at the New York Botanical Garden; b, in the U. S. National Herbarium.

Plate 140. a. PHORADENDRON HELLERI SANGUINEUM. The type (Santo Domingo, *Fuertes*, 1531b). b. P. CRENULATUM. The type (Jamaica, *Harris*, 6659). Both photographed by permission at Dahlem.

Plate 141. PHORADENDRON DUSSII. a. The type (Guadeloupe, *Duss*, 3904 in part); photographed by permission at Dahlem. b. A second collection (Guadeloupe, *Duss*, 2969b); photographed by permission at the New York Botanical Garden.

Plate 142. PHORADENDRON GUNDLACHII. a. The type collection (Cuba, *Wright*, 2650); photographed by permission in the Boissier herbarium at Chambésy. b. A fruiting specimen (Cuba, *Britton*, *Brit-*

ton and Cowell, 13106) ; photographed by permission at the New York Botanical Garden.

Plate 143. PHORADENDRON DOMINGENSE. Two specimens from Jamaica (a, Campbell, 6605; b, Campbell, 6398 in part) ; photographed by permission at the New York Botanical Garden.

Plate 144. PHORADENDRON TRINERVIUM. a. The type collection of *Viscum trinervium* and of *V. myrtilloides* (Martinique, Isert, 1787,—as no. 18296 in the Willdenow herbarium) ; photographed by permission at Dahlem. b. The typical representative of *P. trinervium* in the collection of the author of the binomial (Jamaica, McNab, 68) ; photographed by permission in the Grisebach herbarium at the University of Goettingen.

Plate 145. PHORADENDRON TRINERVIUM. a. The type collection of *Viscum oblongifolium* (Guadeloupe, Perrottet, 1824) ; photographed by permission in the Delessert herbarium at Geneva. b. A second collection (Guadeloupe, Bertero, 1820) ; photographed by permission in the de Candolle herbarium at Geneva.

Plate 146. PHORADENDRON TRINERVIUM. a. Fruiting specimen showing the change from the elongated young fruit to the globose mature fruit (Puerto Rico, Sintenis, 3246) ; photographed by permission in the Delessert herbarium at Geneva. b. A Bahamian specimen (Watling Isl., Wilson, 7254) ; photographed by permission at the New York Botanical Garden.

Plate 147. a. PHORADENDRON APPUNI. The type (British Guiana, Appun, 1783). b. P. APERTUM. The type (British Guiana, Jenman, 3801). Both photographed by permission at Kew.

Plate 148. PHORADENDRON GUAZUMAE. The type (Mexico, Rose, Standley and Russell, 13846) ; photographed by permission in the U. S. National Herbarium.

Plate 149. a. PHORADENDRON SANCTAE-MARTAE. The type (Colombia, Smith, 1284) ; photographed by permission in the U. S. National Herbarium. b. P. RENSONI. The type (El Salvador, Renson, 256) ; photographed by permission at the New York Botanical Garden.

Plate 150. a. PHORADENDRON ZULOAGAE. The type (Venezuela, Zuloaga, 1915). b. P. COMMUTATUM. The type (Mexico, Gregg, 903).

Plate 151. PHORADENDRON COMMUTATUM. Two medium-leaved specimens (a, Rose, Standley & Russell, 14450; b, Rose, 1525) ; photographed by permission in the U. S. National Herbarium.

Plate 152. PHORADENDRON RUBRUM. Two specimens of the prototype of *Viscum rubrum* (Bahamas: a, vol. 2, p. 2, of the Catesby herbarium; b, vol. 2, p. 8, of the same collection); photographed by permission in the Natural History Museum at South Kensington, London.

Plate 153. PHORADENDRON RUBRUM. The type of *P. tetrastachyum spathulifolium* and of *P. spathulifolium* (Cuba, *Wright* 512=1300 b). Photographed by permission: a, in the Grisebach herbarium at Göttingen; b, in the Gray herbarium at Cambridge.

Plate 154. PHORADENDRON QUADRANGULARE. a. Type of *Viscum salicifolium* (Ecuador, *Haenke*); photographed by permission in the herbarium of the German University at Prag. b. A specimen showing the turbinate joints of the partly matured spikes (Ecuador, *Eggers*, 14829); photographed by permission at Dahlem.

Plate 155. a. PHORADENDRON QUADRANGULARE. The type of *Loranthus quadrangularis* (Colombia, *Bonpland*, 1795). b. *P. VISCIFOLIUM*. The type of *L. viscifolius* (Ecuador, *Bonpland*, 3798); both photographed by permission at the Natural History Museum of Paris.

Plate 156. PHORADENDRON WIESNERIANUM. The type (Brazil, *Gardner*, 1674); photographed by permission in the Natural History Museum at Vienna.

Plate 157. PHORADENDRON PIAUHYANUM. a. The type (Brazil, *Gardner*, 2617); photographed by permission in the Natural History Museum at Vienna. b. A specimen showing the turbinate young spike joints (Brazil, *Spruce*, 2909); photographed by permission in the Natural History Museum at Buda Pest.

Plate 158. PHORADENDRON CEIBANUM. The type (Costa Rica, *Pittier*, 3900); photographed in the herbarium at Brussels for Professor Bommer.

Plate 159. PHORADENDRON VENEZUELENSE. a. The type (Venezuela, *Fendler*, 1810); photographed by permission at Kew. b. A second specimen (Panama, *Hayes*, 829); photographed by permission at the New York Botanical Garden.

Plate 160. PHORADENDRON ANTILLARUM. a. The type (Cuba, *Wright*, 1302). b. A broader-leaved specimen in fruit (Puerto Rico (*Stevens & Hess*, 5827)).

Plate 161. PHORADENDRON ANTILLARUM ORIENTALE. a. The type (Cuba, *Britton*, 2119). b. The type of f. *LONGA* (Cuba, *Britton*, 2415). Both photographed by permission at the New York Botanical Garden.

Plate 162. PHORADENDRON TOWNSENDI. a. The type (Socorro Isl., *Barkelew*, 177). b. Another collection (Socorro Isl., *Townsend*, 1899). Both photographed by permission in the U. S. National Herbarium.

Plate 163. a. PHORADENDRON GRACILE. The type, pistillate (Jamaica, *Harris*, 6392). b. P. GRACILE BALLII. The type, staminate (Jamaica, *Ball*, 1882). Both photographed by permission at Dahlem.

Plate 164. PHORADENDRON MICROPHYLLUM. a. The type collection of *Viscum microphyllum* (Brazil, *Pohl*, 245=4583); photographed by permission in the National Museum at Prag. b. A fruiting specimen (Brazil, *Gardner*, 1325); photographed by permission in the Delessert herbarium at Geneva.

Plate 165. PHORADENDRON AFFINE. The type of *Viscum affine* (Brazil, *Pohl* 544). Photographed by permission: a, in the de Candolle herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 166. PHORADENDRON MARTIANUM. a. The type (Brazil, *Gardner*, 1321). b. A fruiting specimen (Brazil, *Gardner*, 1323). Both photographed by permission in the Delessert herbarium at Geneva.

Plate 167. a. PHORADENDRON GAUMERI. The type (Yucatan, *Gaumer*, 561). b. P. TAMAULIPENSE. The type (Mexico, *Seler*, 4484); photographed by permission at Dahlem.

Plate 168. PHORADENDRON ZACAPANUM. a. The type (Guatemala, *Kellerman*, 5612). b. A second specimen (Guatemala, *Kellerman*, 5728).

Plate 169. PHORADENDRON LYONI. The type (Venezuela, *Lyon*, 1900); photographed by permission in the U. S. National Herbarium.

Plate 170. PHORADENDRON EMARGINATUM. a. The type collection (Brazil, *Claussen*, 252); photographed by permission in the Delessert herbarium at Geneva. b. A specimen showing the occasional emphasis of the midrib beneath (Brazil, *Glaziou*, 9861); photographed by permission at Copenhagen.

Plate 171. PHORADENDRON OBOVATIFOLIUM. The type (Paraguay, *Morong*, 1582); photographed at the New York Botanical Garden for Professor Britton.

Plate 172. a. PHORADENDRON MINOR. The type (Brazil, *von Martius*); photographed by permission at Munich. b. P. MUCRONATUM. A representative specimen (Martinique, *Hahn*, 296); photographed by permission in the Delessert herbarium at Geneva.

Plate 173. a. PHORADENDRON YUCATANUM. The type (Yucatan, *Gaumer*, 561 in part); photographed by permission at the Field Museum in Chicago. b. P. OTTONIS. A representative specimen (Venezuela, *Eggers*, 13335); photographed by permission at Copenhagen.

Plate 174. a. PHORADENDRON DEGENIANUM. The type (Colombia, *Smith* 1285); photographed by permission in the Natural History Museum at Buda Pest. b. P. CUNEIFOLIUM. The type (Venezuela, *Fendler*, 1115); photographed by permission in the Grisebach herbarium at Göttingen.

Plate 175. PHORADENDRON CEARENSE MINOR. The type collection (Brazil, *Gardner*, 1669). Photographed by permission: a, in the Natural History Museum at Vienna; b, in the Boissier herbarium at Chambésy.

Plate 176. a. PHORADENDRON CEARENSE. The type collection (Brazil, *Gardner*, 1675); photographed by permission in the Natural History Museum at Vienna. b. P. CARACASANUM. The type (Venezuela, *Gollmer*, 1855); photographed by permission at Dahlem.

Plate 177. a. PHORADENDRON ARGENTINUM. The larger-leaved type (Argentina, *Hieronymus & Lorentz*, 237). b. P. ERNSTIANUM. The type (Peru, *Weberbauer*, 4251). Both photographed by permission at Dahlem.

Plate 178. a. PHORADENDRON MELIAE. The type (Paraguay, *Balansa*, 2495). b. P. PRUINOSUM. The type (Argentina, *Lorentz*, 688). Both photographed by permission at Dahlem.

Plate 179. PHORADENDRON LIGA. The type of *Viscum Liga* (Argentina, *Gillies*). Photographed at Kew for Sir David Prain.

Plate 180. a. PHORADENDRON LIGA. A specimen showing the characteristic sharp nervation (Argentina, *Lorentz*, 431). b. P. HIERONYMI. The type (Argentina, *Hieronymus*, 421). Both photographed by permission at Dahlem.

Plate 181. PHORADENDRON LINEARIFOLIUM. a. The type collection (Brazil, *Riedel*); photographed by permission in the Boissier herbarium at Geneva. b. A specimen in flower (Brazil, *Glaziov*, 19419); photographed by permission at Copenhagen.

Plate 182. PHORADENDRON ENSIFOLIUM. a. The type of *Viscum ensifolium* (Brazil, *Pohl*, 106); photographed by permission in the de Candolle herbarium at Geneva. b. A flowering specimen (Brazil, *Warming*, 381); photographed by permission at Copenhagen.

Plate 183. PHORADENDRON LANCEOLATO-ELLIPTICUM. The type of *Viscum interruptum* and of *V. lanceolato-ellipticum* (Brazil, *Pohl*, 273). Photographed by permission: a, in the de Candolle herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 184. PHORADENDRON MACRARTHURUM. The type collection (Brazil, *Gardner*, 3765). Photographed by permission: a, in the Delessert herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 185. PHORADENDRON FALCIFRONS. The type of *Viscum falcifrons* (Uruguay, *Tweedia*); photographed in the Hooker herbarium at Kew for Sir David Prain.

Plate 186. PHORADENDRON FALCIFRONS. a. A flowering specimen (Uruguay, *Lorentz*, 1779); photographed by permission at Dahlem. b. A flowering specimen (Uruguay, *Balansa*, 3219); photographed by permission in the Delessert herbarium at Geneva.

Plate 187. PHORADENDRON TUCUMANENSE. A type collection (Argentina, *Lorentz & Hieronymus*, 728); photographed in the herbarium at Brussels for Professor Bommer.

Plate 188. a. PHORADENDRON TUCUMANENSE. A fruiting specimen (Argentina, *Fiebrig*, 2174). b. P. KUNTZEI. The type (Bolivia, *Kuntze*, 20). Both photographed by permission at Dahlem.

Plate 189. PHORADENDRON NORTHROPÆ. a. The type (Andros Isl., *Northrop*, 551); photographed by permission at Dahlem. b. A second collection (Andros Isl., *Brace*, 5325); photographed by permission at the New York Botanical Garden.

Plate 190. PHORADENDRON UNDULATUM. The type of *Viscum undulatum* (Brazil, *Pohl*, 1828). Photographed by permission: a, in the de Candolle herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 191. a. PHORADENDRON UNDULATUM. A flowering specimen (Bolivia, *Bang*, 363); photographed by permission in the Boissier herbarium at Geneva. b. P. HERMINIERI. The type (Guadeloupe, *Duss*, 3904 in part); photographed by permission in the U. S. National Herbarium.

Plate 192. PHORADENDRON GRACILISPICUM. a. The type (Costa Rica, *Tonduz*, 12215). b. A second collection (Costa Rica, *Tonduz*, 10110). Both photographed by permission in the U. S. National Herbarium.

Plate 193. PHORADENDRON PERUVIANUM. The type (Peru, *Ruiz*); photographed by permission at Dahlem.

Plate 194. PHORADENDRON BALANSAE. The type (Paraguay, *Balansa*, 2497); photographed by permission at Dahlem.

Plate 195. a. PHORADENDRON BALANSAE HASSLERI. The type (Paraguay, *Hassler*, 7436); photographed by permission in the Delessert herbarium at Geneva. b. P. AVENIA. The type (Colombia, *Stuebel*, 165); photographed by permission at Dahlem.

Plate 196. PHORADENDRON ENGLERIANUM. The types: a, staminate; b, pistillate (Peru, *Weberbauer*, 1902); photographed by permission at Dahlem.

Plate 197. PHORADENDRON MANDONII. a. The type collection (Bolivia, *Mandon*, 1467); photographed by permission in the Natural History Museum at Vienna. b. P. MATHEWSI. The type (Peru, *Mathews*, 1846); photographed by permission in the Delessert herbarium at Geneva.

Plate 198. PHORADENDRON WARMINGII. a. The type (Brazil, *Warming*, 383). b. The type collection of *P. rugulosum* (Brazil, *Glaoui*, 4012). Both photographed by permission at Copenhagen.

Plate 199. PHORADENDRON HEYDEANUM. The type (Guatemala, *Heyde & Lux*, 3140); photographed by permission in the U. S. National Herbarium.

Plate 200. PHORADENDRON HEXASTICHUM. a. The type of *Viscum hexastichum* (Cuba, *de la Ossa*, 1825); photographed by permission in the de Candolle herbarium at Geneva. b. A second collection (Martinique, *Sieber*, 227 in part); photographed by permission at Dahlem.

Plate 201. a. PHORADENDRON HEXASTICHUM ANGUSTIFOLIUM. The type (Grenada, *Eggers*, 6140); photographed by permission at Dahlem. b. P. OLIVERIANUM. The type (Mexico, *Liebmann*, 3085); photographed by permission at Copenhagen.

Plate 202. PHORADENDRON RACEMOSUM. a. The type of *Viscum macrophyllum* (Puerto Rico, *Bertero*, 1820); photographed by permission in the de Candolle herbarium at Geneva. b. The type collection of *V. glandulosum* (Surinam, *Focke*); photographed by permission at Kew.

Plate 203. PHORADENDRON RACEMOSUM. a. A round-leaved specimen (British Guiana, *Schomburgk*). b. A short-spiked specimen (Santo Domingo, *Eggers*, 2011). Both photographed by permission at Dahlem.

Plate 204. PHORADENDRON PRODUCTIPES. a. The type (Brazil, *Gardner, 1676*); photographed by permission in the Natural History Museum at Vienna. b. The type collection of *P. hexastichum* v. *longispica* (Brazil, *Gardner, 2112*); photographed by permission in the Delessert herbarium at Geneva.

Plate 205. a. PHORADENDRON BOLIVIANUM. The type (Bolivia, *Bang*, as second collection for 632). b. *P. CERINOCARPUM*. The type (Santo Domingo, *Wright, Parry & Brummel, 459*). Both photographed by permission at the New York Botanical Garden.

Plate 206. PHORADENDRON CERINOCARPUM. Flowering and fruiting material (Santo Domingo, *Fuertes, 275*). Photographed by permission: a, in the Delessert herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 207. PHORADENDRON CARINATUM. The type (British Guiana, *Jenman, 2542*); photographed by permission at Kew.

Plate 208. a. PHORADENDRON BRITTONIANUM. The type collection (Bolivia, *Bang, 632*). b. *P. PTERONEURON*. A flowering specimen (Brazil, *Robert, 439*). Both photographed by permission at Dahlem.

Plate 209. PHORADENDRON PTERONEURON. a. A small-leaved specimen (Brazil, *Riedel, 1829*); photographed by permission at Copenhagen. b. A round-leaved specimen (Brazil, *Gardner, 1677*); photographed by permission in the Delessert herbarium at Geneva.

Plate 210. a. PHORADENDRON FRAGILE. One of the original collections, all very fragmentary (Brazil, *Glaziou, 22023*); photographed by permission at Dahlem. b. *P. TUNAEFORME*. The type collection of *Viscum articulatum* and of *V. tunaeforme* (Brazil, *Pohl, 1928*); photographed by permission in the Natural History Museum at Vienna.

Plate 211. a. PHORADENDRON EGGERSI. The type (Ecuador, *Eggers, 15229*). b. *P. FENDLERIANUM*. The type (Venezuela, *Fendler, 1102*). Both photographed by permission at Dahlem.

Plate 212. PHORADENDRON PARADOXUM. The type (Venezuela, *Karsten, 5*): a, reduced two-thirds; b, natural size. Photographed by permission at Dahlem.

Plate 213. PHORADENDRON CRASSIFOLIUM. The type of *Viscum crassifolium* (Brazil, *Pohl, 457*). Photographed by permission: a, in the de Candolle herbarium at Geneva; b, in the Natural History Museum at Vienna.

Plate 214. a. PHORADENDRON CRASSIFOLIUM. The type of *P. pericarpum* (Brazil, *Wilkes Expedition*); photographed by permission

in the Gray herbarium at Cambridge. b. *P. CRASSIFOLIUM MULTIFLORUM*. The type (Brazil, *Riedel*) ; photographed by permission at Munich.

Plate 215. *PHORADENDRON CRASSIFOLIUM PITTIERI*. The type (Guatemala, *Tonduz*, 6863). Photographed at Brussels for Professor Charles Bommer.

Plate 216. *PHORADENDRON MARTINICENSE*. a. The type of *Viscum martinicense* (Martinique, *Sieber*, 227) ; photographed by permission in the Delessert herbarium at Geneva. b. A fruiting specimen (Gadeloupe, *Duss* 3891) ; photographed by permission at Dahlem.

Plate 217. *PHORADENDRON PIPEROIDES*. a. The type of *Loranthus piperoides* (Colombia, *Bonpland*, 1871) ; photographed by permission in the Natural History Museum at Paris. b. The type collection of *Viscum Schottii* (Brazil, *Pohl*, 246) ; photographed by permission in the National Museum at Prag.

Plate 218. *PHORADENDRON PIPEROIDES*. The type of *Viscum laurifolium* (Mexico, *Leibold*) ; photographed by permission at the German University in Prag.

Plate 219. *PHORADENDRON PIPEROIDES*. Two specimens of the *laurifolium* group : a, Mexico, *Purpus*, 3693 ; b, Guatemala, *Kellerman*, 5822.

Plate 220. *PHORADENDRON PIPEROIDES*. The type of *Loranthus torulosus* (Colombia, *Bonpland*, 3808) ; photographed by permission in the Natural History Museum at Paris.

Plate 221. *PHORADENDRON PIPEROIDES*. a. The typical form of *Viscum sauruioides* (French Guiana, *Patris*) ; photographed by permission in the Delessert herbarium at Geneva. b. The type of *V. tere-ticaule cubense* (Cuba, *de la Ossa*) ; photographed by permission in the de Candolle herbarium at Geneva.

Plate 222. *PHORADENDRON PIPEROIDES*. a. The type of *Viscum ellipticum* (Mexico, *Haenke*) ; photographed by permission in the National Museum at Prag. b. The type of *V. cornifolium* (Mexico, *Haenke*) ; photographed by permission in the German University at Prag.

Plate 223. a. *PHORADENDRON GARDNERIANUM*. The type (Brazil, *Gardner*, 2885) ; photographed by permission at Dahlem. b. *P. ESSEQUIBENSE*. The type (British Guiana, *Jenman*, 2252) ; photographed by permission at Kew.

Plate 224. PHORADENDRON STRONGYLOCLADOS. a. The type collection (Brazil, *Gardner*, 1029) ; photographed by permission in the Gray herbarium at Cambridge. b. A second collection (Brazil, *Gardner*, 3205) ; photographed by permission at Dahlem.

Plate 225. a. PHORADENDRON JOHNSTONI. The type (Cocke Isl., *Johnston*, 10) ; photographed by permission in the Gray herbarium at Cambridge. b. P. CAESALPINIAE. The type (Brazil, *Ule*, 7243) ; photographed by permission at Dahlem.

Plate 226. PHORADENDRON SURINAMENSE. The type (Surinam, *Versteeg*, 239) ; photographed at Leiden by Dr. I. Boldingh.

Plate 227. PHORADENDRON PLATYCAULON. Two of the type extremes. (Brazil, *Spruce* : a, no. 1=226 ; b, 2=228). Photographed by permission : a, in the Grisebach herbarium at Göttingen ; b, at Munich.

Plate 228. a. PHORADENDRON PACHYPHYLLUM. The type (Venezuela, *Fendler*, 1103β) ; photographed by permission in the Grisebach herbarium at Göttingen. b. P. KNOOPH. The type (Venezuela, *Knoop*, iii, b) ; photographed by permission at Dahlem.

Plate 229. PHORADENDRON CHRYSOCLADON. a. The type (Brazil, *Wilkes Expedition*) ; photographed by permission in the Gray herbarium at Cambridge. b. A fruiting specimen (Brazil, *Saltzmann*, 302) ; photographed by permission in the Delessert herbarium at Geneva.

Plate 230. PHORADENDRON CHRYSOCLADON. The type of *P. reticulatum* (Brazil, *Glaziov*, 7664) ; photographed by permission at Copenhagen.

Plate 231. a. PHORADENDRON MEMBRANACEUM. The type (Ecuador, *Sodi*ro, 148/18) ; photographed by permission at Dahlem. b. P. QUINQUENERVIUM. The type collection (Costa Rica, *Tonduz*, 11457) ; photographed by permission in the U. S. National Museum.

Plate 232. PHORADENDRON SUPRAVENULOSUM. a. The type (Guatemala, *von Tuerckheim*, 8574). b. A fruiting specimen (Guatemala, *von Tuerckheim*, 7967). Both photographed by permission in the U. S. National Museum.

Plate 233. PHORADENDRON FLAVENS. a. Flowering specimen (Jamaica, *Watt*, 6219) ; photographed for Dr. N. L. Britton at the New York Botanical Garden. b. Fruiting specimen, one leaf seen from beneath (St. Vincent, *Eggers*, 6746) ; photographed by permission at Dahlem.

Plate 234. a. PHORADENDRON TRISULCATUM. The type (Ecuador, *Spruce*, 6202) ; photographed by permission at Kew. b. P. URBANI-

ANUM. The type (Peru, *Ule*, 6681) ; photographed by permission at Dahlem.

Plate 235. PHORADENDRON LINDAVIANUM. The type (Peru, *Web-erbauer*, 1288) ; photographed by permission at Dahlem.

Plate 236. PHORADENDRON LAXIFLORUM. The type (Brazil, *Ule*, 5251) ; photographed by permission at Dahlem.

Plate 237. a. PHORADENDRON HUALLAGENSE. The type (Peru, *Ule*, 6664). b. *P. DICHOTOMUM*. The type of *P. Giordanae* (Venezuela, *Knoop*, iii, a). Both photographed by permission at Dahlem.

Plate 238. PHORADENDRON DICHOTOMUM. a. The type of *Viscum dichotomum* (Santo Domingo, *Bertero*, 710) ; photographed by permission in the National Museum at Prag. b. The type of *P. Berteri-anum* (Santo Domingo, *Bertero*) ; photographed by permission in the de Candolle herbarium at Geneva.

Plate 239. a. PHORADENDRON DICHOTOMUM (Puerto Rico, *Sintenis*, 3058). b. *P. DICHOTOMUM OVATIFOLIUM*. The type (Santo Domingo, *Eggers*, 1845). Both photographed by permission at Dahlem.

Plate 240. PHORADENDRON CYMOSUM. The type (Venezuela, *Gollmer*, 1856) ; photographed by permission at Dahlem.

Plate 241. PHORADENDRON GALAPAGEIUM. The type of *Viscum galapageium* (Charles Isl., *Darwin*, 1835) ; photographed for Mr. C. E. Moss in the Henslow herbarium at the University of Cambridge.

Plate 242. PHORADENDRON HENSLOVII. The type of *Viscum Henslovii* (Chatham Isl., *Darwin*, 1835) ; photographed for Mr. C. E. Moss in the Henslow herbarium at the University of Cambridge.

Plate 243. a. PHORADENDRON HENSLOVII (Chatham Isl., *Steindachner*, 67) ; photographed by permission in the Natural History Museum at Vienna. b. *P. UNCINATUM*. The type (South Narborough Isl., *Snodgrass & Heller*, 325) ; photographed by permission in the Gray herbarium at Cambridge.

Plate 244. a. PHORADENDRON CAMPINENSE. The type (Brazil, *de Campos Novaes*, 417 in part) ; photographed by permission in the U. S. National Herbarium. b. *P. HOLTONIS*. The type (Colombia, *Holton*, 655) ; photographed by permission in the Boissier herbarium at Cham-bésy.

Plate 245. PHORADENDRON LINDENI. The type (Colombia, *Linden*, 846). Photographed by permission: a, in the Natural History Museum at Vienna; b, in the Delessert herbarium at Geneva.

INDEXES

A. COLLECTIONS

Abrams
 2687. *P. villosum*
 2749. *P. longispicum*
 3230. *P. californicum*
 — & McGregor
 — *P. densum*
 33, 49. *P. longispicum*
 Alderson
 705. *P. longispicum*
 Alexander
 — *P. Grisebachianum*
 Ames
 (1858). *P. flavescens*
 Anderson
 — *P. flavescens*
 Andrieux
 346. *P. calyculatum*
 347. *P. velutinum*
 Anthony
 (1897). *P. Townsendi*
 Applegate
 (1899). *P. densum*
 Appun
 1783. *P. Appuni*
 Arechavaleta
 136. *P. falcifrons*
 Arsène
 6. *P. Forestierae*
 8. *P. velutinum*
 7, 10, 896. *P. brachystachyum*
 Aschenborn
 — *P. velutinum*
 147. *P. villosum*
 428. *P. brachystachyum*
 Austin
 (1876). *P. ligatum*
 698 pp. *P. Libocedri*
 698 pp. *P. villosum*

Baker (see Earle)
 203. *P. villosum*
 2096. *P. ceibanum*
 2559. *P. antillarum*
 2602. *P. piperoides*
 —, Earle & Tracy
 92. *P. juniperinum*
 — & Nutting
 (1894). *P. densum*
 (1894). *P. villosum*
 Balansa
 2495. *P. Meliae*
 2496, 3218. *P. Liga*
 2497. *P. Balansae*
 2498, 4722. *P. piperoides*
 3219. *P. falcifrons*
 3220, 4721. *P. Casimiranum*
 Balbis—see Bertero
 Baldwin
 307. *P. flavescens*
 Ball
 (1882). *P. gracile* v.
 Bang
 363, 2903. *P. undulatum*
 632. *P. Brittonianum*
 632 (ii). *P. bolivianum*
 657, 1717. *P. crassifolium*
 Barber (see Townsend)
 (1901). *P. villosum*
 Barkelew
 177. *P. Townsendi*
 Barnes & Land
 284. *P. carneum*
 Bartlett
 6. *P. flavescens*
 Baur
 286. *P. Henslovii*
 Beardslee & Kofoed
 (1891). *P. flavescens*

- Bélanger
 130. *P. martinicense*
 131. *P. hexastichum*
 Bentham herbarium
 — *P. Tonduzii*
 Berg
 (1904). *P. villosum*
 Berlandier
 — *P. brachystachyum*
 678, 2088. *P. Engelmanni*
 1158. *P. velutinum*
 1364. *P. tomentosum*
 Berlin herbarium
 — *P. velutinum*
 Bertero
 —, 8, 1234. *P. antillarum*
 — *P. mucronatum*
 — *P. racemosum*
 — *P. tetrapterum*
 —, (1820). *P. trinervium*
 439 pp. *P. anceps*
 439 pp. *P. chrysocarpum*
 710, (1821). *P. dichotomum*
 Bessey
 (1875). *P. villosum*
 Beyrich
 — *P. piperoides*
 (1834). *P. flavescens*
 Bidwell
 (1890). *P. villosum*
 Bigelow
 —, 77. *P. flavescens*
 (1853-4), 5, 5a. *P. californicum*
 (1853-4). *P. californicum* v.
 (1853-4). *P. Havardianum*
 (1854). *P. villosum*
 (1854), 2. *P. pauciflorum*
 1 pp. *P. Libocedri*
 1 pp. *P. densum*
 3, 6. *P. juniperinum*
 3 pp. *P. macrophyllum*
 7. *P. villosum* v.
 8, 9. *P. Coryae*
 Biltmore herbarium
 4339a, *P. flavescens*
 Bioletti (see Michener)
 1892. *P. villosum*
 Bolley
 (1892), 7072, 7078, *P. piperoides*
 Bischoff
 — *P. juniperinum*
 (1871). *P. californicum*
 Bitting
 1079. *P. flavescens*
 Blanchet
 — *P. bathyoryctum*
 Blankinship
 (1891). *P. villosum*
 Blasdale
 1019. *P. villosum*
 Bloomer
 (1863-4). *P. ligatum*
 Blumer
 (1905). *P. Cockerellii*
 (1906), 1524, 1957, 1989,
P. capitellatum
 95, 105, 109, 110, 1532, 1956, 1990.
P. juniperinum
 129, 197, 1514, 1516, 1521, 1976,
 3601. *P. Coryae*
 1520, 1523, 1533, 1946. *P. macro-*
phyllum
 1517, 1534-5. *P. macrophyllum* f.
 1531. *P. Coryae* f.
 Bolander
 (1866). *P. ligatum*
 2670. *P. longispicum*
 2671. *P. villosum*
 Boldingh
 1660. *P. trinervium*
 Bonpland
 1795. *P. quadrangulare*
 3508. *P. angustifolium*
 3798. *P. viscifolium*
 3808. *P. piperoides*
 Bosc
 — *P. flavescens*
 Botteri
 873. *P. nervosum*

Boundary Survey

1235. *P. Bolleanum*
1236. *P. californicum* v.

Bourgeau

572. *P. brachystachyum*
782, 1004, 1116. *P. velutinum*
1473, 1483, 2546, 3034. *P. nervosum*
1482. *P. Wawrae*
1962, 2175. *P. piperoides*

Brace

- 3428, 4643. *P. rubrum*
4461. *P. trinervium*
5325. *P. Northropiae*

Brainerd

- (1911). *P. flavescens*

Brandegge

- (1879), 1234. *P. juniperinum*
(1889, 1892). *P. californicum*
(1889, 1892). *P. Coryae*
(1889). *P. Diguettii*
(1889). *P. peninsulare*
(1889). *P. saecatum*
(1892). *P. globuliferum*
(1892). *P. tumidum*
(1893). *P. Libocedri*
(1893). *P. pauciflorum*
(1904). *P. Guazumae*
512. *P. Eduardi*

Braunton

792. *P. longispicum*
1258. *P. villosum*

Brendel

- (1860). *P. flavescens*

Brenes

- 14406, 14519. *P. gracilispicum*
14407. *P. Tonduzii*

Brewer

113. *P. longispicum*
564. *P. villosum*
865. *P. densum*

Britton (see Harris)

- (1892). *P. flavescens*
165, 1950, 1985, 2052, 2119, 2840,
3668. *P. antillarum*

Britton—continued

- 180, 3968. *P. flavens*
355. *P. Wattii*
807, 1895, 1927, 3068, 3795, 3905.
P. domingense
813. *P. tetrapterum*
965, 977, 1467, 3144, 3215. *P. Grisebachianum*
1985, 2119, 2415. *P. antillarum* v.
2687. *P. piperoides*
2991, 3283, 3668. *P. gracile*
3703, 3734, 3765, 3773. *P. Campbellii*
— & Brace
832. *P. rubrum*
—, Britton & Cowell
10241. *P. antillarum*
13106. *P. Gundlachii*
— — & Marble
1946. *P. chrysocarpum*
— — & Wilson
5579. *P. antillarum*
— & Cowell
1293. *P. trinervium*
1301, 1352. *P. chrysocarpum*
12553. *P. antillarum*
— — & Shafer
12919. *P. antillarum* v.
12928. *P. piperoides*
—, Earle & Wilson
4585, 4687. *P. antillarum*
— & Hollick
1861. *P. Fici*
1890. *P. domingense*
2772. *P. Grisebachianum*
— & Marble
2245. *P. antillarum*
2248. *P. trinervium*
— & Millspaugh
5867, 6325. *P. rubrum*
— & Shafer
1640. *P. Helli*
1644. *P. antillarum*
1831. *P. chrysocarpum*
1844. *P. trinervium*

- Britton, Stevens & Hess
 2470, 4888. *P. piperoides*
 2535, 2569. *P. racemosum*
 2564. *P. tetrapterum*
 — & Wilson
 4886, 5644. *P. antillarum*
 Broadhead
 (1887). *P. Engelmanni*
 Broadway
 1019. *P. flavens* v.
 1021, 1894. *P. hexastichum*
 1021b, 1873, 3982. *P. piperoides*
 2596. *P. martinicense*
 Brown (see Heller)
 51. *P. Grisebachianum*
 114. *P. flavescens*
 394. *P. antillarum*
 921. *P. longispicum*
 953. *P. villosum*
 Bruce
 687. *P. Libocedri*
 1786. *P. villosum*
 Brummel—see Wright
 Buchtien
 163, 1411. *P. semiteres*
 3156. *P. Kuntzei*
 Buck
 319. *P. mucronatum*
 454. *P. dichotomum*
 Buckley
 — *P. flavescens*
 Burchell
 2129. *P. linearifolium*
 3124, 3165. *P. crassifolium*
 3313. *P. piperoides*
 4396. *P. undulatum*
 4559. *P. craspedophyllum*
 Burrall
 1125. *P. Coryae*
 1126. *P. macrophyllum*
 1127-9. *P. juniperinum*
 Bush
 (1899), 526. *P. flavescens*
 1160. *P. flavescens* v.
- Butler
 565. *P. villosum*
 1071. *P. densum*
 Buysman
 (1883). *P. flavescens*
 Campbell
 (1896), 6384, 6400. *P. gracile*
 6383, 6387, 6398 pp., 6581, 6604-5,
 6676, 6714, 6781, 7264, 8138, 9568,
 10175. *P. domingense*
 6385-6, 6401. *P. Wattii*
 6398 pp., 6604. *P. Campbellii*
 de Campos Novaes
 417 pp. *P. campinense*
 417 pp. *P. crassifolium*
 Canby
 (1869). *P. macrotomum*
 (1880). *P. flavescens*
 Carter—see Small
 Catesby
 — *P. rubrum*
 Chadbourne
 — *P. flavescens*
 Chamberlain
 — *P. densum*
 Chandler (see Hall)
 (1897) *P. longispicum*
 5456 pp. *P. californicum*
 5456 pp., 6043. *P. villosum*
 Chesnut
 595. *P. villosum*
 Christ
 1960. *P. racemosum*
 2096. *P. dichotomum*
 2232. *P. piperoides*
 von Christman
 — *P. carneum*
 Clark
 (1857). *P. flavescens*
 Clarke
 1-5. *P. villosum*
 Claussen
 —, 44-5. *P. piperoides*

- Claussens—continued
 43. *P. crassifolium*
 113, 252. *P. emarginatum*
- Clendon
 (1871). *P. ligatum*
- Coffman
 (1913). *P. densum*
- Cohon
 7. *P. Coryae*
- Coker
 (1911). *P. flavescens*
 303, 558. *P. rubrum*
- Combs
 299. *P. antillarum*
 347-8. *P. rubrum*
- Congdon
 (1903). *P. Libocedri*
 (1903). *P. pauciflorum*
- Conzatti
 (1897). *P. Conzattii* v.
 (1913). *P. carneum*
 2124. *P. brevifolium*
 2198. *P. brachystachyum*
 2199. *P. Robinsonii*
- & Gomez.
 2380. *P. Conzattii*
- & Gonzalez
 72. *P. brachystachyum*
 295. *P. calyculatum* v.
 1187. *P. Conzattii* v.
- & Vasquez
 1476. *P. brachystachyum*
- Cooper
 (1860-1861). *P. californicum* v.
 (1861). *P. villosum* v.
 5931. *P. Cooperi*
- Copeland
 3542. *P. densum*
- Cory
 (1911). *P. Coryae*
- Coues & Palmer
 323. *P. Coryae*
- Coulter
 21. *P. velutinum*
- Coville
 1074, 1915. *P. Coryae*
 1351. *P. ligatum*
 1352. *P. densum*
 1617. *P. californicum*
 1946. *P. juniperinum*
- & Funston
 130, 589. *P. densum*
 279. *P. californicum* v.
 307. *P. ligatum*
 1192. *P. pauciflorum*
 1729. *P. Libocedri*
- Cowell (see Britton)
 626. *P. racemosum*
 753. *P. antillarum*
- Cowen
 (1892). *P. juniperinum*
- Crawford
 783. *P. Grisebachianum*
- Crueger
 111, 2720. *P. flavens* v.
 305. *P. trinervium*
 1649, 2724. *P. piperoides*
- Cuming
 (1823). *P. flavescens*
 184. *P. angustifolium*
- Curran
 (1886). *P. Libocedri*
- Curtis
 (1852). *P. flavescens*
- Curtiss
 (1872). *P. flavescens*
 2459, 4569. *P. macrotomum*
- Cusick
 2637. *P. ligatum*
 2760a. *P. densum*
- Czermak & Reineck
 199. *P. bathyoryctum*
 312, 637. *P. ensifolium*
 367. *P. piperoides*
- Darlington
 — *P. flavescens*
- Darwin
 (1835). *P. galapageium*
 (1835). *P. Henslovii*

- Davidson
 (1898). *P. flavescens*
 5929. *P. californicum*
- Davis—see Pammel
- Davy
 45. *P. californicum*
 205, 2603. *P. densum*
 551. *P. villosum*
 2027. *P. pauciflorum*
- de la Ossa
 (1825). *P. hexastichum*
- de la Sagra
 — *P. antillarum*
- de Pedeguara
 2690. *P. amplifolium*
- Deam
 6099. *P. robustissimum* v.
- Dean
 — *P. flavescens*
- Department of Agriculture
 — *P. californicum*
- Dewey
 — *P. californicum* v.
 644. *P. piperoides*
- Diedrick
 118. *P. flavescens*
- Diehl
 296. *P. juniperinum*
 570. *P. Coryae*
- Dignet
 (1894). *P. Dignetii*
 107. *P. carneum*
 108. *P. Reichenbachianum*
 109. *P. brachystachyum*
 111. *P. calyculatum* v.
- Dodson
 (1896). *P. flavescens*
- Douglass
 (1887). *P. juniperinum*
- Drake
 15115. *P. Coryae*
 15116-7, 15120, 15121. *P. macrophyllum*
 15118. *P. capitellatum*
- Drew
 (1889). *P. villosum*
- Drummond
 140. *P. flavescens*
- du Barry
 (1865). *P. coloradense*
- Ducke
 2513. *P. crassifolium*
 2530b. *P. piperoides*
- Dugès
 30, 266a. *P. carneum*
- Duss
 100, 4156. *P. mucronatum*
 101 pp., 1374b pp., 2966, 2969 pp.,
 3902 pp., 4418 pp. *P. chrysocarpum*
 101 pp., 2969 pp., 4418 pp. *P. piperoides*
 102, 960, 1373, 2968 pp., 4099, 4417.
P. trinervium
 1374b pp., 2969 pp., 3891, 3902 pp.,
 3904, 4137a. *P. martinicense*
 1375, 4137, 4415. *P. hexastichum*
 2966 pp., 3904 pp., 4157, 4418 pp.
P. Herminieri
 2968 pp., 2969 pp., 3904 pp., 4099
 pp., 4417 pp. *P. Dussii*
- Earle—see Baker; Tracy; Underwood
- & Baker
 (1897). *P. flavescens*
- & Tracy
 334. *P. juniperinum*
- Eastwood
 (1894). *P. villosum* v.
 (1896), 3542. *P. densum*
 (1897-8). *P. pauciflorum*
- Eaton
 1310. *P. Eatoni*
- Eby
 — *P. macrophyllum*
 (1888, 1893, 1894). *P. flavescens*
- Edgerton
 — *P. flavescens*

- Edmunds
— *P. flavescens*
- Eggers
93, 965, 1651, 1983, 3328, 4782. *P. antillarum*
661, 946, 6398. *P. flavens* v.
880 pp., 926, 1147. *P. chrysocarpum*
880 pp., 1741, 2011. *P. racemosum*
1400, 4668, 4724, 4902, 6077, 6396.
P. piperoides
1682. *P. anceps*
1845. *P. dichotomum* v.
1899. *P. hexastichum*
3847, 3877. *P. rubrum*
6140. *P. hexastichum* v.
7060. *P. trinervium*
13335. *P. Ottonis*
14829. *P. quadrangulare*
15229. *P. Eggersii*
- Eggert
(1892, 1896), 450. *P. flavescens*
- Ehrenberg
— *P. tomentosum*
13. *P. antillarum*
422 pp. *P. brachystachyum*
422 pp. *P. velutinum*
1011. *P. pachyarthron*
- Elmer
1758, 3794. *P. villosum*
3607. *P. densum*
- Emanuel
1. *P. antillarum*
- Endlich
634, 1048. *P. velutinum*
689. *P. californicum* v.
1138. *P. nervosum*
1164. *P. ligatum*
1170, 1220, 1267. *P. puberulum* v.
1219. *P. Schumanni*
1222. *P. Bolleanum*
1895. *P. Robinsonii*
1899. *P. brachystachyum*
1899a. *P. Forestierae*
- Endres
139. *P. supravenulosum*
- Engelmann
— *P. Coryae*
— *P. densum*
— *P. villosum*
1840), 706. *P. flavescens*
(1880). *P. californicum*
(1880). *P. Libocedri*
(1880). *P. macrophyllum*
707. *P. flavescens* v.
— & Sargent
(1880). *P. californicum* v.
(1880). *P. densum*
- Faxon
(1873). *P. flavescens*
- Fendler
— *P. flavescens*
112, 136, 654. *P. piperoides*
281. *P. juniperinum*
651, 1117, 1341, 1810. *P. venezuelense*
1102. *P. Fendlerianum*
1103, 1103 β . *P. pachyphyllum*
1104. *P. polygynum*
1105. *P. rigidum*
1106. *P. tubulosum*
1108. *P. ovalifolium*
1109. *P. gracilispicum*
1110, 1111, 1761. *P. towarensense*
1115. *P. cuneifolium*
1762. *P. longipetiolatum*
1811. *P. bilineatum*
2396. *P. crassifolium*
- Ferriss
— *P. californicum* v.
— *P. Engelmanni*
— *P. juniperinum*
— *P. macrophyllum*
- Fiebrig
32, 4981. *P. obovatifolium*
51, 511. *P. piperoides*
2174. *P. tucumanense*
- Field Museum herbarium
— *P. Greggii*
- Finley
(1900). *P. villosum*

Fitch (see Rose; Shafer)

(1849). *P. villosum*

Focke

— *P. racemosum*

716. *P. dimidiatum*

1019. *P. obtusissimum*

Frank

(1835, 1837). *P. flavescens*

Fraser

(1860). *P. Verleyseni* v.

Fredholm

6474. *P. macrotomum*

Fremont

106. *P. macrophyllum*

Friedrichsthal

(1841). *P. robustissimum* v.

(1841). *P. Tonduzii*

1625. *P. tamaulipense*

Fuertes

240, 1175, 1393. *P. mucronatum*

275, 927. *P. cerinocarpum*

383, 827. *P. antillarum*

1531b. *P. Helleri* v.

Funcko

295. *P. Ottonis*

Funston—see Coville

Gabriel

(1802). *P. Perrottetii*

(1802). *P. piperoides*

Galeotti

2692. *P. brachystachyum*

2694. *P. Galeottii*

2695. *P. piperoides*

2696. *P. calyculatum*

Garber

24. *P. antillarum*

Gardner

436. *P. nitidum*

1028, 1321, 1323, 1673-4, 2619. *P.*

Martianum

1029, 3205. *P. strongyloclados*

1319, 2625. *P. coriaceum*

1320, 1678, 1960. *P. piperoides*

2617. *P. piahyanum*

Gardner—continued

1324-5. *P. microphyllum*

1669. *P. cearense* v.

1670-1. *P. emarginatum*

1672. *P. dipterum*

1673-4. *P. Wiesnerianum*

1675. *P. cearense*

1676, 1679. *P. productipes*

1677. *P. pteroneuron*

1680, 2618, 2621, 2626, 3762-3, 3765.

P. bathyoryctum

1958. *P. tunaeforme*

2620, 2881. *P. crassifolium*

2622. *P. craspedophylloides*

2885. *P. Gardnerianum*

3764, "3765." *P. congestum*

3765. *P. macrarthrum*

Gaudichaud

(1833), 473, 573. *P. ulophyllum*

567. *P. Martianum*

574. *P. acinacifolium*

Gaumer

561 pp. *P. Gaumeri*

561 pp. *P. yucatanum*

876. *P. vernicosum*

Gilbert

(1873). *P. californicum*

(1874). *P. Coryae*

(1883). *P. macrotomum*

104. *P. macrophyllum*

Gillies

— *P. Liga*

Girard

— *P. Coryae*

— *P. juniperinum*

Glaziou

1428, 1431, 1432, 4008, 7661. *P. piperoides*

1432-3, 1460, 4004 pp., 4005, 7666,

14884. *P. crassifolium*

1462. *P. pteroneuron*

2598 pp., 8728, 14887 pp. *P. Martianum*

2598, 8728. *P. microphyllum*

4003, 6893, 8243. *P. undulatum*

4004 pp. *P. Glaziovii*

Glaziou—continued

- 4009, 7663, 8730. *P. ulophyllum*
 4010. *P. coriaceum* v.
 4012. *P. Warmingii*
 4013. *P. nitidum*
 6073. *P. acinacifolium*
 7664. *P. chrysoclodon*
 8729. *P. holoxanthum* v.
 9419, 9468, 12032-3, 13926. *P. linearifolium*
 9861, 14887, *P. emarginatum*
 10898, 11608, 22023. *P. fragile*
 139-9a. *P. platycaulon*
 22021. *P. Crulsii*
 22024. *P. tunaeforme*

Gleason

- (1902). *P. flavescens*

Goldman

178. *P. ligatum*

Gollmer

- (1854). *P. granaticolum*
 (1854). *P. venezuelense*
 (1855). *P. caracasenum*
 (1856). *P. cymosum*

Gomez—see Conzatti

Gonzalez—see Conzatti

Goodding (see Kennedy)

- 725 pp. *P. californicum* v.
 725 pp., 884, 1026 pp. *P. juniperinum*
 1026 pp., 2135, 2139. *P. californicum*
 2149. *P. Bolleanum*

Graham

- (1911). *P. flavescens*
 231. *P. brachystachyum*
 233. *P. Reichenbachianum*

Grant

- 977, 4517 pp. *P. Libocedri*
 4517 pp., 4533. *P. villosum*
 — & Wheeler
 979, 6243. *P. villosum*

Graves

1697. *P. longispicum*

Gray

- (1842). *P. macrotomum*

Greene

- (1880). *P. californicum*
 (1880). *P. capitellatum*
 (1880). *P. Coryae* f.
 (1880). *P. juniperinum*

Greenman

120. *P. commutatum*
 1140. *P. vernicosum*

Gregg

- 31, 254. *P. Greggii*
 255. *P. lanceolatum*
 399. *P. saltillense*
 722. *P. Reichenbachianum*
 725. *P. brachystachyum*
 745. *P. carneum*
 895. *P. puberulum*
 903. *P. commutatum*
 1202. *P. mazatlanum*

Gregory

- (1890). *P. villosum*

Griffiths

- (1912), 2019, 3539. *P. californicum*
 (1912). *P. longispicum*
 1797, 2678, 3644, 3676. *P. macrophyllum*
 2616, 3454. *P. Coryae*
 3674, 6144. *P. macrophyllum* f.
 11135. *P. juniperinum*

— & Hunter

405. *P. ligatum*

— & Thornber

191. *P. macrophyllum* v.
 205. *P. californicum*

Griggs—see Underwood

Grinnell

- 399, 402. *P. longispicum*

Grisebach herbarium

- *P. nervosum*
 — *P. piperoides*

Guedes

2365. *P. piperoides*

Guilting

- *P. flavens* v.

Guilding—continued

- *P. hexastichum*
- *P. trinervium*

Guillemin

- 43. *P. crassifolium*
- 185. *P. Martianum*
- 1472. *P. chrysocarpum*

Habel

- (1868). *P. Henslovii*

Haenke

- *P. obliquum*
- *P. piperoides*
- *P. quadrangulare*

Hahn

- (1865-6). *P. Purpusi*
- (1865-6). *P. Robinsonii*
- 296, 1383, 1385. *P. mucronatum*
- 298. *P. martinicense*
- 550, 783, 1132. *P. chrysocarpum*
- 1386. *P. hexastichum*
- 410. *P. velutinum*
- 456. *P. villosum*

Hall

- 2531. *P. villosum*
- 2565. *P. Libocedri*
- 6014. *P. californicum*

— & Chandler

- 527. *P. Libocedri*

Hansen

- (1887), 74, 721 pp. *P. Libocedri*
- (1897). *P. gracile*
- (1897). *P. Grisebachianum*
- 720. *P. villosum*
- 721 pp. *P. ligatum*
- 1310. *P. antillarum*

Harper

- 1888. *P. flavescens*

Harris

- 6203. *P. flavens*
- 6341, 6376, 6397, 10202, 10861. *P. Grisebachianum*
- 6384, 6392, 6400, 6544, 6585, 6661. *P. gracile*
- 6393, 6545, 6576, 6926. *P. tetrap-
terum*

Harris—continued

- 6395, 6402, 6599, 6680, 6711, 9697. *P. Wattii*
- 6383, 6552, 6781, 7264, 10175. *P. domingense*
- 6577, 6584, 6927. *P. antillarum*
- 6659. *P. crenulatum*
- 9220. *P. Fici*
- 10188. *P. Wattii* f.
- 10339. *P. piperoides*

— & Britton

- 10519. *P. Wattii*
- 10529. *P. trinervium*

Harshberger

- 1912. *P. Eatoni*

Hart

- (1896). *P. trinervium*
- 6101. *P. Hartii*
- 6116. *P. venezuelense*
- 6118. *P. piperoides*

Hartman

- 944. *P. capitellatum*
- 945. *P. californicum* v.
- 946. *P. macrophyllum* f.

Harvey

- (1829). *P. trinervium*

Hasse

- *P. densum*
- *P. flavescens*
- (1889, 1893), 4626. *P. longispicum*

Hassler

- 191. *P. acinacifolium*
- 298. *P. obovatifolium*
- 913, 6364. *P. piperoides*
- 2732, 7551. *P. Liga*
- 7436. *P. Balansae* v.

Havard

- (1881). *P. Cockerellii*
- 82, 84. *P. Havardianum*
- 83. *P. Bolleanum*

Hay—see Rose

Hayes

- 323, 829. *P. venezuelense*
- 616. *P. piperoides*

Haynald herbarium
— *P. chrysocarpum*

Heald
(1909, 1911). *P. Engelmanni*

Hedgecock
422, 427. *P. Engelmanni*
784, 1512, 1654-5, 3993, 4911, 4939,
8136, 9319, 9833, 15980. *P. juniperinum*
841, 9953. *P. Cockerellii*
815-7, 842-3, 4853, 4872-3, 4916,
4921-2, 4940, 9860, 15100, *P. Coryae*
1893, 1896, 4840. *P. villosum*
1895, 1898. *P. Libocedri*
4915. *P. densum*
4923. *P. longispicum*
4924, 4933. *P. macrophyllum*
8269. *P. flavescens*
9685. *P. capitellatum*

— & Long
4829, 9720. *P. pauciflorum*
9677-8, 9686, 9688, 9830-32, 9855. *P. Coryae*
9692. *P. macrophyllum*
9696, 9814. *P. californicum*
9815. *P. californicum* v.
9817, 9854, 9862. *P. juniperinum*
9861. *P. Cockerellii*

— & Meinecke
4805, 4830. *P. Libocedri*
4829. *P. pauciflorum*

Hedrick
180. *P. juniperinum*
181. *P. Coryae*

Heller (see Snodgrass)
(1896). *P. californicum*
205, 6186. *P. antillarum*
514. *P. racemosum*
750. *P. flavescens*
1376. *P. Engelmanni* v.
3534. *P. juniperinum*
6161. *P. trinervium*
6188. *P. Helleri*
10464. *P. californicum* v.

Heller & Brown
5036. *P. villosum*

Henry
(1890). *P. flavescens*

Herriek
133. *P. Coryae*
985. *P. juniperinum*

Hess (see Britton)
675. *P. hexastichum*
1913. *P. piperoides*
5402. *P. antillarum*

Heyde & Lux
3140. *P. Heydeanum*
3141. *P. uspanstanum*

Hieronymus (see Lorentz)
(1873), 421. *P. Hieronymi*
419. *P. argentinum*
729. *P. Liga*

— & Lorentz
237. *P. argentinum*

— & Niederlein
(1878). *P. crassifolium*
165. *P. pruinatum*

Hillebrand
(1863). *P. villosum*

Hillman
11715. *P. ligatum*

Hinds
(1841). *P. Robinsonii*

Hioram
(1912). *P. antillarum*

Hitchcock
(1890). *P. antillarum*
(1890). *P. rubrum*
(1890). *P. Wattii*

Hoffmann
219. *P. Cooperi*
360. *P. robustissimum*
378. *P. ceibanum*
809. *P. gracilispicum*

Hollick (see Britton)
(1880). *P. villosum*

Holmes
(1906). *P. pauciflorum* f.

Holstein

— *P. Engelmanni*

Holton

654-5. *P. Holtonis*656. *P. quadrangulare*

Hooker herbarium

— *P. chrysocarpum*— *P. flavens* v.

Hopkins—see Munson

Hopping

263. *P. longispicum*264. *P. villosum*

Horn

(1863). *P. villosum*

Hostmann (& Kappler)

729 *P. piperoides*

Hottes

(1914). *P. juniperinum*(1914). *P. Libocedri*(1914). *P. villosum*

Hough

— *P. densum*18, 87. *P. juniperinum*

Howell

(1884, 1887). *P. Libocedri*(1884), 1264. *P. villosum*

Huber

469. *P. affine*

Hulst

(1893). *P. flavescens*

Humboldt

— *P. minutifolium*

Hunter—see Griffiths

Hutchens

(1900). *P. Libocedri*(1900). *P. villosum*

Im Thurn

(1897). *P. racemosum*

Imray

— *P. trinervium*212. *P. chrysocarpum*216, 386. *P. flavens* v.

Isert

(1787). *P. tetrapterum*(1787). *P. trinervium*

Jack

(1907). *P. villosum*

James

(1879). *P. longispicum*

Jameson

— *P. parietarioides*608. *P. Verleyensi*

Jenman

650, 1218, 2221, 2545, 3781, 3868,

4747. *P. piperoides*1217, 2533, 3628, 7433. *P. crassifolium*2218, 4055. *P. racemosum*2247, 3795, 4821. *P. Perrottetii*2252. *P. essequibense*2539. *P. obtusissimum*2541, 4678. *P. Jenmani*2542. *P. carinatum*2546. *P. demerarae*3801. *P. apertum*

Jepson

(1894). *P. longispicum* v.(1894). *P. villosum*(1894, 1904). *P. longispicum*

Jermy

(1904). *P. Engelmanni*(1904). *P. Engelmanni* v.

Johnson

8270, 8279. *P. juniperinum*

Johnston

10. *P. Johnstoni*

Jones

(1882), 3703. *P. densum*(1882), 3028. *P. villosum*(1884, 1905, 1906, 1907). *P. californicum*(1884, 1903). *P. capitellatum*(1884). *P. Cockerellii*(1884). *P. coloradense*

(1900), 2081, 2095aa, 4041, 6045.

P. juniperinum(1900). *P. pauciflorum*

Jones—continued

- (1903). *P. Bolleanum*
 (1903). *P. ligatum*
 (1903), 4041, 4253. *P. Coryae*
 (1903, 1904), 5013. *P. californicum*
 v.
 (1903). *P. puberulum* v.
 570. *P. carneum*
 3028. *P. longispicum*
 3734. *P. villosum*
 4279, 4281. *P. macrophyllum* v.

Jones herbarium

2469. *P. flavescens*

Joor

- *P. Engelmanni*

Jordan

- 8296, 8332. *P. villosum*

Kalbreyer

353. *P. gracilispicum*

Kappler—see Hostmann

Karsten

- *P. polygynum*
 5. *P. paradoxum*

Karwinski

- (1833). *P. longifolium*
 (1844). *P. Schumanni*
 — *P. calyculatum*
 — *P. Robinsonii*
 — *P. tamaulipense*

Kearney

2356. *P. flavescens*

Kellerman

4541. *P. velutinum*
 4551, 4829. *P. vulcanicum*
 4720. *P. commutatum*
 5100. *P. robustissimum* v.
 5154-5. *P. multiflorum*
 5604, 5612, 5728, 5972. *P. zacapa-*
 num
 5822. *P. piperoides*

Kellogg

- (1909). *P. flavescens* v.

Kennedy & Goodding

57. *P. californicum* v.

Kerber

- 34, 351. *P. nervosum*
 87. *P. Robinsonii*
 88. *P. brachystachyum*
 301. *P. piperoides*
 1990. *P. tamaulipense*

Killingsworth

- (1915). *P. flavescens*

Kirkwood (see Lloyd)

147. *P. tomentosum*

Knieskern

- *P. flavescens*

Knoop

- iii. *P. venezuelense*
 iii b. *P. Knoopii*

Knowlton

188. *P. juniperinum*

Kofoed—see Beardslee

Korthals

- (1843). *P. flavescens*

Krebs

101. *P. flavescens*

Krug

537. *P. chrysocarpum*
 538. *P. antillarum*

Kuntze

- (1874). *P. villosum*
 — *P. affine*
 3, 4, 36. *P. bathyoryctum*
 5. *P. Liga*
 6. *P. Meliae*
 9. *P. hypericifolium*
 10. *P. falseifrons*
 15. *P. reductum*
 16, 17, 679. *P. piperoides*
 18, 19. *P. emarginatum*
 20. *P. Kuntzei*
 219, 415. *P. racemosum*
 426. *P. tetrapterum*
 495. *P. antillarum*
 1597. *P. tubulosum*
 3168. *P. densum*
 23231. *P. juniperinum*

Kurtz6772, 8434. *P. Liga*6783. *P. Hieronymi*6784. *P. Balansae*

Land—see Barnes

Lapham1874. *P. flavescens***Lay**(1903). *P. Cockerellii***L'Herminier**a. *P. Herminieri***Le Jolis herbarium**— *P. Ottonis*871. *P. antillarum***Lehmann**3565, 8538. *P. gracilispicum*6667. *P. Trianae***Leiberg**285. *P. ligatum*3150. *P. Libocedri*3152. *P. pauciflorum*3161. *P. densum*3215. *P. longispicum***Leibold**— *P. piperoides***Lemmon (see Parry)**(1875, 1879). *P. Libocedri*(1875, 1879). *P. ligatum*(1875). *P. villosum*266. *P. capitellatum*267. *P. californicum* v.**Leprieur**97, 194-5. *P. Perrottetii***Levy**1293. *P. ceibanum***Lewers**(1892). *P. Libocedri*— *P. ligatum***Liebmann***— *P. piperoides*2, 3098-9, 3100. *P. commutatum***Liebmann—continued**3, 3089, 5, 3090. *P. nervosum*4, 3097. *P. Purpusi*6, 3085. *P. Oliverianum*7, 11, 3083. *P. brachystachyum*8. *P. colipense*9, 3102. *P. Robinsonii*12, 3080, 13, 3106. *P. amplifolium*16, 3084. *P. brevifolium***Lighthipe**(1897). *P. macrotomum***Lillo**5414. *P. tucumanense*20256. *P. Hieronymi***Lindberg**253. *P. undulatum*253a. *P. nitidum***Linden**43. *P. crassifolium*538. *P. calyculatum*541. *P. Galeottii*796. *P. Briquetianum*846. *P. Lindeni*1960. *P. piperoides***Lindheimer**

115, 227, 406, 445, 1120, 1121, 1122.

*P. Engelmanni***Link herbarium**— *P. craspedophylloides***Lloyd**(1907). *P. californicum*(1907). *P. macrophyllum*147. *P. tomentosum*207. *P. Herminieri*208. *P. flavens* v.463. *P. trinervium*765. *P. hexastichum*

— & Kirkwood

15. *P. tomentosum***Löfgren**799. *P. crassifolium*1074. *P. tunaeforme*

*The smaller numbers are the originals, under which the specimens are cited by Oliver; the others, those of the herbarium sheets as now numbered.

- Long (see Hedgecock)
 12041. *P. Engelmanni* v.
 12048. *P. flavescens* v.
 15103. *P. Engelmanni*
 15133, 15155-6, 15180-1, 15214,
 15242. *P. macrotomum*
 15169. *P. flavescens*
- Lorentz—see Hieronymus
 344, 395, 431, 471, 478. *P. Liga*
 364, 432, 468. *P. Hieronymi*
 382, 688. *P. pruinatum*
 632, 1779, 1879, 4772. *P. falcifrons*
 — & Hieronymus
 219, 420. *P. Liga*
 223, 235, 335, 782. *P. tucumanense*
- Lumholtz
 30. *P. californicum*
- Lund
 21. *P. bathyoryctum*
 385. *P. piperoides*
- Lunt
 6117. *P. Hartii*
 6118. *P. piperoides*
- Luschnath
 — *P. crassifolium*
 (1835). *P. piperoides*
 (1839). *P. crassifolium* v.
- Lux—see Heyde
- Lyon (see Robinson)
 (1900). *P. Lyoni*
 (1905). *P. ligatum*
- Mandon
 1467. *P. Mandonii*
- Manning
 58. *P. ligatum*
- Marble (see Britton)
 231. *P. Wattii*
- March
 1316. *P. trinervium*
- Marker
 (1901). *P. flavescens*
- Martens
 1622. *P. crassifolium*
- Martin
 — *P. flavescens*
 — *P. Perrottetii*
- von Martius
 — *P. acinacifolium*
 — *P. affine*
 — *P. bathyoryctum*
 — *P. coriaceum*
 — *P. crassifolium*
 — *P. emarginatum*
 — *P. habrostachyum*
 — *P. minor*
 — *P. multifoveolatum*
 — *P. platycaulon*
 — *P. tunaeforme*
- Mathews
 (1846). *P. Mathewsi*
- Matthes
 573. *P. Engelmanni*
- Matthews
 (1883). *P. juniperinum*
- Maxon
 1675. *P. antillarum*
 4337. *P. piperoides*
- Mac Dougal
 (1904). *P. californicum*
 142. *P. juniperinum*
 612. *P. macrophyllum*
- McCarthy
 — *P. flavescens*
 1879. *P. flavescens*
- McClatchie
 (1893). *P. pauciflorum*
 (1893). *P. villosum*
- McCrory—see von Schrenk
- McFadyen
 — *P. flavens*
- McGregor—see Abrams
- McNab
 68. *P. trinervium*
- Mearns
 164. *P. macrophyllum*
 171. *P. flavescens* v.

Mearns—continued

- 172, 300, 2485, 2529. *P. capitellatum*
 391, 1633, 1760, 2395, 2427, 2479,
 2528, 2643. *P. Coryae*
 2644. *P. californicum* v.
 2742, 2894. *P. californicum*
 3013, 3198. *P. densum*
 3617, 3767. *P. villosum*

Meek

- (1889). *P. flavescens*

Meinecke—see Hedgecock

Meislahn

155. *P. macrotomum*

Mell

- (1907). *P. macrotomum*

Menzel

- *P. Engelmanni* v.

Merton

2073. *P. capitellatum*

Metcalf

- 26, 31. *P. Cockerellii*
 737. *P. juniperinum*
 925. *P. Coryae*

Mexico—see Boundary Survey

Meyer

720. *P. piperoides*

Michener & Bioletti

- (1893). *P. villosum*

Moeller

- *P. piperoides*

Moore

534. *P. crassifolium*
 954. *P. affine*

Morgan—see Pollard

Moritz

307. *P. venezuelense*

Morong

- 358, 1546. *P. acinacifolium*
 618. *P. Liga*
 954. *P. Balansae* f.
 1582. *P. obovatifolium*

Mueller

- 221, 1755. *P. brachystachyum*

Mueller—continued

1219. *P. nervosum*
 1570. *P. tamaulipense*

Muhlenberg

639. *P. flavescens*

Mulford

141. *P. Havardianum*
 374. *P. juniperinum*
 670. *P. Coryae*

Munro

- 15109, 15110. *P. Coryae*
 15111, 15112. *P. juniperinum*

Munson and Hopkins

- (1889). *P. juniperinum*

Nash

98. *P. mucronatum*
 150a. *P. racemosum*
 633. *P. dichotomum*

— & Taylor

- 947, 1021, 1314, 1342. *P. rubrum*
 1151. *P. dichotomum*
 1251. *P. piperoides*
 1322. *P. antillarum*

Nealley

- (1890). *P. Bolleanum*

Nelson

- 1982, 2018. *P. amplifolium*
 2074. *P. calyeulatum*
 2650. *P. commutatum*
 4756, 4921. *P. Bolleanum*

Neuwied—see Wied-Neuwied

Nicholson

16. *P. antillarum*

Niederlein

95. *P. decussatum*
 102. *P. falcifrons*
 171, 1277. *P. piperoides*

Noack

- *P. piperoides*

Northrop

451. *P. Northropiae*
 704. *P. racemosum*

Nuttall

- *P. flavescens*

Nuttall—continued

(1834). *P. villosum*

(1836). *P. californicum*

Nutting—see Baker

Oersted*

1, 3103. *P. Rensoni*

3, 3086 pp. *P. gracilispicum*

3, 3086 pp. *P. piperoides*

4, 14, 3082, 3096. *P. annulatum*

5, 3091, 3093. *P. Cooperi*

Orcutt

— *P. densum*

234. *P. Libocedri*

545. *P. pauciflorum*

1310, 2027, 2044. *P. californicum*
v.

1310a. *P. villosum*

2013. *P. californicum*

Otto

556. *P. venezuelense*

565. *P. Ottonis*

Pabst

554 pp. *P. crassifolium*

554 pp. *P. piperoides*

Painter—see Rose

Palmer (see Coues; Parry)

(1853-4). *P. Balansae*

(1875, 1877). *P. juniperinum*

(1876). *P. macrophyllum*

21, 81. *P. tamaulipense*

79. *P. ligatum*

84. *P. Schumanni*

85. *P. guadalupense*

88. *P. globuliferum*

103, 291. *P. thyrsoideum*

119. *P. Palmeri*

254. *P. flavescens*

270. *P. californicum* v.

440. *P. villosum*

441, 506, 665. *P. californicum*

442. *P. densum*

719. *P. carneum*

777. *P. tomentosum*

778. *P. Bolleanum*

882. *P. Eduardi*

Pammel

(1888). *P. Engelmanni*

— & Davis

114. *P. villosum*

Paris herbarium

— *P. platycaulon*

198. *P. piperoides*

Parish

680. *P. longispicum*

684. *P. californicum*

899. *P. densum* v.

970, 3005, 5071. *P. Libocedri*

1073. *P. villosum*

1443. *P. pauciflorum*

1444. *P. ligatum*

Parry (see Wright)

(1877). *P. californicum* v.

877. *P. Libocedri*

— & Lemmon

373. *P. Libocedri*

— & Palmer

799. *P. falcatum*

799½. *P. thyrsoideum*

Parsons

(1877). *P. juniperinum*

Patris

— *P. piperoides*

Paul of Wuerttemberg

(1831). *P. velutinum*

Pavon

— *P. angustifolium*

— *P. brachystachyum*

— *P. semiteres*

Pearce

(1864). *P. tucumancense*

Peck

444, 530. *P. piperoides*

824. *P. crassifolium* v.

Peckolt

624. *P. crassifolium*

de Pedeguarra

2690. *P. amplifolium*

*See note under Lehmann.

Perriam

- *P. flavescens*

Perrottet

- (1820). *P. racemosum*
(1820), 229. *P. piperoides*
(1824). *P. trinervium*
228. *P. Perrottetii*

Picarda

- 5a, 16a. *P. racemosum*
72, 132b, 301, 448. *P. antillarum*
215. *P. dichotomum*
1605. *P. piperoides*
1623. *P. hexastichum*
1640, 1666. *P. haitense*

Pilsbry

- (1904). *P. macrotomum*
(1906). *P. capitellatum*
(1906). *P. Coryae* and f.
(1906). *P. juniperinum*

Pittier (see also Tonduz)

- 816, 14117. *P. crispum*
1258, 2932, 3312. *P. gracilispicum*
1637. *P. robustissimum* v.
2604. *P. venezuelense*
3345, 3357, 3903. *P. piperoides*
3900, 6638. *P. ceibanum*
3901-2, 6580. *P. crassifolium* v.

Pittmann

- (1902). *P. flavescens*

Plank

- (1895). *P. juniperinum*

Platt

- (1894). *P. longispicum*

Poeppig

- (1824). *P. antillarum*
(1829-30). *P. Lindavianum*
2859. *P. crassifolium* f.

Pohl

- (1828), 246, 4319. *P. piperoides*
106. *P. ensifolium*
245, 4583. *P. microphyllum*
273. *P. lanceolato-ellipticum*
457. *P. crassifolium*
544. *P. affine*

Pohl—continued

568. *P. undulatum*
1928. *P. tunaeforme*

Poiteau

- *P. anceps*
(1819-21, 1824). *P. piperoides*
617. *P. dichotomum*

Pollard & Morgan

- 247a. *P. flavescens*

Pond

183. *P. Libocedri*
189, 192. *P. villosum*
191. *P. densum*

Powell

- *P. flavescens*

Pratten

- *P. ligatum*

Prax

- (1854). *P. antillarum*

Prenleloup

507. *P. racemosum*

Preuss

1372. *P. robustissimum* v.

Price

- *P. flavescens*

Pringle

- (1881). *P. californicum* v.
(1881). *P. Coryae*
(1883), 845. *P. Greggii*
(1884). *P. californicum*
(1884), 1358. *P. juniperinum*
(1884). *P. macrophyllum*
(1885), 256. *P. Bolleanum*
80. *P. antillarum*
1854, 2668, 8647. *P. carneum*
8191. *P. nervosum*
4699, 13189. *P. calyceulatum*
4434. *P. tequilense*
6290. *P. Forestierae*
6630, 11159, 13188. *P. Pringlei*
6272, 9467, 13765. *P. Robinsonii*
6759, 7027, 8009, 11160. *P. brachy-*
stachyum
8058, 9509, 13190. *P. velutinum*

Purdie

- *P. flavens*
- *P. mucronatum*

Purpus

- (1912). *P. Purpusi*
- (1912), 2877. *P. nervosum*
- (1912), 3693. 3806. *P. piperoides*
- 2. *P. juniperinum*
- 1106. *P. Greggii*
- 1441, 4087, 5073. *P. brachystachyum*
- 1777. *P. velutinum*
- 2724. *P. lanatum*
- 5322. *P. commutatum*
- 5832. *P. Robinsonii*
- 6279. *P. calyeulatum* v.
- 6280. *P. tamaulipense*
- 6401. *P. Galeottii*

Rafinesque

- (1823). *P. flavescens*

Ramage

- 1888. *P. piperoides*

Ransdell

- *P. flavescens*

Rattan

- *P. villosum*
- (1912). *P. longispicum*

Ravenel

- *P. flavescens*

Raymond

- 1869. *P. flavescens*

Read

- *P. flavescens*
- *P. trinervium*

Rehn & Viereck

- (1902). *P. capitellatum*

Reineck—see Czermak**Renson**

- 256. *P. Rensoni*
- 284. *P. robustissimum* v.

Beverchon

- 837. *P. Engelmanni*

Ricksecker

- 302. *P. chrysocarpum*

Riedel

- (1829). *P. pteroneuron*
- *P. bathoryetum*
- *P. chrysoclodon*
- *P. crassifolium* and f.
- *P. piperoides*
- *P. platycaulon*
- *P. undulatum*

Robert

- 439. *P. pteroneuron*
- 522. *P. piperoides*

Robinson & Lyon

- (1900). *P. Lyoni*

Rojas

- 2732. *P. Liga*

Rolfs

- (1891), 538. *P. flavescens*

Rose

- 1525. *P. commutatum*
- 1712, 3409. *P. scaberrimum*
- 3442. *P. Bolleanum*
- 16293. *P. brachyphyllum*
- 16354, 16617. *P. peninsulare*
- 16562. *P. saccatum*
- 16583. *P. californicum* v.
- 16780. *P. californicum*
- 16848. *P. aureum*
- 16862. *P. tumidum*
- , Fitch and Russell
- 3936. *P. cerinocarpum*
- & Hay
- 5873. *P. Forestierae*
- 5939. *P. Robinsonii*
- , Painter & Rose
- 9160, 9873. *P. brachystachyum*
- 9707. *P. lanatum*
- 9742. *P. carneum*
- 9877. *P. Robinsonii*
- 9965. *P. brevifolium*
- & Rose
- 11259. *P. Robinsonii*
- 11260. *P. brachystachyum* v.
- & Russell
- 19751. *P. emarginatum*
- 19799. *P. affine*
- 19908. *P. stenophyllum*

Rose & Russell—continued

20027. *P. dipterum*20369. *P. fragile*

—, Standley & Russell

12211. *P. Engelmanni* v.12574, 13520. *P. brachystachyum*13165. *P. californicum* v.13846. *P. Guazumae*14450. *P. commutatum*

Ross

148. *P. velutinum*459. *P. carneum*718. *P. nervosum*723. *P. Galeottii*

Rothrock

261, 510, 814. *P. juniperinum*262, 794. *P. Coryae*338. *P. californicum*362. *P. macrophyllum*

Rothschuh

464. *P. robustissimum* v.

Rugel

269b. *P. antillarum*270. *P. piperoides*

Ruiz

— *P. peruvianum*— *P. piperoides*

Rusby

(1896). *P. racemosum*(1909). *P. Libocedri*(1910). *P. Conzattii*177. *P. carneum*389. *P. Coryae*390, 7262. *P. juniperinum*1387, 1543 pp. *P. crassifolium*1542. *P. acinacifolium*1546. *P. undulatum*1547. *P. bolivianum*

Russell (see Rose)

1889. *P. californicum*

Safford

1438. *P. carneum*

Sagot herbarium

296. *P. piperoides*1291. *P. Perrottetii*

Saltzmann

302. *P. chrysocladon*

Sargent—see Engelmann

Sartorius

— *P. piperoides*

Saunders

(1906). *P. longispicum*

Savage & Stull

1174. *P. flavescens*

Schaffner

188, 459. *P. velutinum*

Schenck

2132. *P. piperoides*3902. *P. Martianum*4238. *P. tunaeforme*4282. *P. pteroneuron*

Scherfee

(1914). *P. villosum*

Schiede

402. *P. minutifolium*403. *P. falcatum*

Schmitz

150. *P. velutinum*

Schnabel

(1911). *P. macrotomum*

Schoenfeldt

3045. *P. densum*3400. *P. villosum*3687. *P. coloradense*

Schomburgk

— *P. piperoides*554. *P. racemosum*

Schott

(1855). *P. capitellatum*— *P. coloradense*— *P. piperoides*

von Schrenk

(1912). *P. flavescens* v.

— & McOrory

(1912). *P. flavescens*

Schumann

711. *P. Schumanni*

Schwanke

— *P. antillarum*

Schweinitz

(1829). *P. flavescens*

Schweinitz herbarium

— *P. piperoides*

Seemann

— *P. Bolleanum*2140. *P. Schumanni*2141. *P. Reichenbachianum*

Seler

119, 1763. *P. tlacolulense*422, 4484. *P. tamaulipense*4731. *P. juniperinum*

Selkirk

1771-2. *P. Coryae*9816. *P. californicum*

Sello

122. *P. Selloi*155. *P. craspedophyllum*234. *P. craspedophylloides*498. *P. piperoides*511, 597. *P. acinacifolium*5266. *P. crassifolium*5347. *P. holoxanthum*

von Seneloh

259. *P. piperoides*

Shafer (see Britton)

159, 296, 363, 371, 563, 815, 1109,

1622, 11823, 11828, 12109, 12403.

*P. antillarum*296, 371. *P. rubrum*314, 320, 600, 607, 2003. *P. triner-*
vium

331, 3270, 8116, 8517, 8601, 8607,

8737. *P. piperoides*8590. *P. hexastichum*8817. *P. dichotomum*12178. *P. Gundlachii*

— & Fitch

1472. *P. chrysocarpum*

Shear

4200, 4206, 4259. *P. macrophyllum*

Shimek

(1898). *P. flavescens*

Short

(1852). *P. flavescens*

Sieber

— *P. piperoides*227 pp. *P. hexastichum*227 pp. *P. martinicense*

Simpson

49. *P. macrotomum*— *P. Cockerellii*

Sintenis

339, 339b pp., 339c, 1270, 1388,

4154, 4391, 4494, 4614, 4840. *P.**piperoides*339b pp., 887, 4894, 5297, 6060. *P.**chrysocarpum*

885, 887b, 3035, 2292b, 3912, 5562,

6624, 6701. *P. antillarum*887c, 3034, 3246, 3248. *P. triner-**vium*

2345b, 2348, 3058, 4288, 6114, 6419.

*P. dichotomum*2836, 5383. *P. hexastichum*5409, 6758 pp. *P. tetrapterum*6758 pp. *P. racemosum*

Sitgreaves

— *P. juniperinum* f.

Skehan

('899). *P. juniperinum*

Small

(1893). *P. flavescens*

— & Carter

8479. *P. Northropiae*

Smith

(1872). *P. macrotomum*34, 1306. *P. trinervium*183, 2310. *P. flavescens*245 pp., 1305. *P. chrysocarpum*245 pp., 248, 263, 1278, 2039. *P.**piperoides*297. *P. hexastichum*360. *P. tamaulipense*374. *P. flavens* v.1280. *P. venezuelense*1281. *P. exiguum*1282, 1285. *P. Degenianum*1283. *P. Herbert-Smithii*1284. *P. sanctae-martae*2097. *P. robustissimum* v.

Smith—continued

2610. *P. annulatum*
 5466. *P. villosissimum*
 5483. *P. densum*

Snodgrass & Heller

- 40, 228, 825. *P. Henslovii*
 325. *P. uncinatum*

Sodiolo

- (1871, 1873), 19c, 28-30, 32, 148/29,
 148/29b. *P. Verleyseni*
 (1872). *P. quadrangulare*
 (1872, 1874), 148/28. *P. piperoides*
 (1874), 148/21. *P. amplexens*
 a, 148/16. *P. obliquum*
 c, i, 148/20, 148/25. *P. parietari-*
oides
 e, 148/18. *P. membranaceum*

Solender

- (1893). *P. californicum* v.
 (1893). *P. Libocedri*

Soulard

- *P. Engelmanni*
 (1872). *P. flavesceus*

Spaulding

- 299-301. *P. longispicum*
 302. *P. juniperinum*

Sprengel herbarium

- *P. antillarum*
 — *P. hexastichum*

Spruce

- (1850-51), 1, 2, 226, 228. *P. platy-*
caulon
 4, 739, 2909. *P. piauhyanum*
 140. *P. caripense*
 732, 904. *P. crassifolium* f.
 1563. *P. crassifolium*
 2112. *P. productipes*
 3480. *P. pellucidulum*
 6202. *P. trisulcatum*

Stahl

- 45, 1043. *P. antillarum*
 1043b. *P. chrysocarpum*

Standley (see Rose; Wootton)

- (1906). *P. Coryae*
 525. *P. Cockerellii*

Stearns

- (1911). *P. Cockerellii*
 (1911). *P. Engelmanni*

Steetz

- *P. flavesceus*

Steiger

- (1894). *P. longispicum*

Steindachner

67. *P. Henslovii*

Stevens (see Britton)

- *P. flavesceus*
 4817 pp. *P. racemosum*
 4818, 4819, 4828, 4887, 5210, 5211.
P. tetrapterum
 5212, 5825b, 5826-9, 5907-8, 5935.
P. antillarum
 5825, 5825a, 5899, 5931. *P. chryso-*
carpum
 5825c. *P. Helleri*

— & Hess

- 4563, 4988. *P. antillarum*
 4548, 4561. *P. trinervium*
 4888. *P. piperoides*

Stocking

- *P. flavesceus*

Stokes

- (1895). *P. Libocedri*
 (1895). *P. longispicum*
 (1895). *P. villosum*

Stuckert

11778. *P. pruinolum*
 11778, 13337, 14526, 20248. *P. Me-*
liae
 13363. *P. Hieronymi*
 13363, 18606, 20256. *P. Balansae*
 14569, 16437. *P. Liga*
 20252. *P. argentinum*

Stuebel

165. *P. avenium*

Stull—see Savage

Sumierast

341. *P. commutatum*

Suringar

- *P. trinervium*

- Tainturier
— *P. flavescens*
- Tate
129(198). *P. supravenuosum*
- Tatnall
— *P. flavescens*
- Taylor (see Nash)
28, 415. *P. racemosum*
223, 338, 481, 497. *P. antillarum*
328. *P. hexastichum*
- Thomas
— *P. coloradense*
- Thornber (see Griffiths)
14t. *P. californicum*
100. *P. Coryae*
- Thurber
(1851). *P. juniperinum*
865. *P. lanceolatum*
- Tillotson
8329. *P. densum*
- Tonduz (see Pittier)
1393, 7884, 10110, 12215. *P. gracilispicum*
1840, 7840 pp., 13142. *P. Heydeanum*
3900, 6638. *P. ceibanum*
6863. *P. crassifolium* v.
11457. *P. quinquenervium*
11458-9. *P. piperoides*
7840 pp., 12179. *P. Tonduzii*
12749. *P. supravenuosum*
13705. *P. robustissimum*
- Torrey
— *P. flavescens*
- Toumey
(1894), 14, 291. *P. californicum*
(1894), 2, 288, 290. *P. Coryae*
(1894, 1895), 10, 292. *P. juniperinum*
(1894), 33, 289. *P. macrophyllum*
(1895). *P. capitellatum*
- Townsend
(1899). *P. Townsendi*
— and Barber
164. *P. juniperinum*
- Tracy (see Baker; Earle)
— & Earle
188. *P. Engelmanni*
- Trelease
— *P. flavescens*
(1892). *P. densum*
(1892). *P. villosum* v.
(1897). *P. Engelmanni* v.
(1901). *P. californicum* v.
(1915). *P. flavescens* v.
362. *P. Coryae* f.
363. *P. capitellatum*
- Triana
2777. *P. turbinispicum*
2778. *P. Trianae*
- Trudeau
— *P. flavescens*
- von Tuerckheim
435, ii 2045. *P. Rondeletiae*
2616. *P. antillarum*
3284. *P. hexastichum*
7661. *P. stipiticarpum*
7967, 8574. *P. supravenuosum*
8745. *P. piperoides*
ii 2168. *P. falcifolium*
- Tweedia
— *P. falcifrons*
- Tweedy
596-8. *P. juniperinum*
- Tyler
(1904). *P. Engelmanni* v.
- Uhde
1026-7. *P. velutinum*
- Urb
850. *P. piperoides*
1791, 4598. *P. crassifolium*
4800. *P. piperoides* f.
4938. *P. linearifolium*
5251. *P. laxiflorum*
6664. *P. huallagense*
6681. *P. Urbanianum*
6948. *P. tunaeforme*
7243. *P. Caesalpiniae*
- Underwood & Earle
1311. *P. piperoides*

Underwood & Griggs

- 211. *P. antillarum*
- 283. *P. antillarum* v.
- 554. *P. trinervium*
- 671. *P. chrysocarpum*

United States—see Boundary Survey; Wilkes Exped.

Van Goes

- *P. trinervium*

Van Hermann

- 1448. *P. antillarum*
- 4887. *P. piperoides*

Varamel

- *P. mucronatum*

Vasey

- (1875, 1880). *P. longispicum*
- (1875). *P. flavescens*
- (1880). *P. villosum*
- (1881). *P. californicum* v.
- (1881). *P. juniperinum*

Vasquez—see Conzatti

Vauthier

- *P. tunaeforme*

Ventenat herbarium

- *P. trinervium*

Verleysen

- 148*, 148**. *P. Verleyseni*

Versteeg

- 239. *P. surinamense*

Viereck—see Rehn

Vreeland

- 806. *P. juniperinum*
- 807. *P. Coryae*
- 808. *P. Cockerellii*

Wagner

- (1858). *P. corynarthron*

Walpole

- 152, 380. *P. villosum*
- 230, 418. *P. densum*

Ward

- (1876). *P. flavescens*

Ward—continued

- (1891). *P. Engelmanni* v.
- (1912). *P. macrotomum*
- 116. *P. villosum*
- 360. *P. juniperinum*

Warming†

- (1891-2). *P. Lyoni*
- *P. affine*
- 14, 381. *P. ensifolium*
- 15, 369. *P. bathyoryctum*
- 17, 384. *P. tunaeforme*
- 373. *P. crassifolium*
- 383. *P. Warmingii*

Watt

- 6219. *P. flavens*
- 6221. *P. Wattii*

Wawra

- 420, 865. *P. nervosum*
- 567. *P. tamaulipense*
- 747. *P. Wawrae*

Weberbauer

- 1288. *P. Lindavianum*
- 1860. *P. crassifolium*
- 1903-4. *P. Englerianum*
- 4251. *P. Ernstianum*

Weddell

- (1858). *P. amplexicaule*
- (1858), 1594. *P. Martianum*
- 378. *P. piperoides*

Werner

- (1892). *P. flavescens*

Wheeler (see Grant)

- (1872). *P. ligatum*
- (1872). *P. Coryae*

Whited

- 3179. *P. ligatum*

Wied Neuwied

- *P. crassifolium*
- (1829). *P. piperoides*
- (1836). *P. flavescens*

Wilcox

- (1892). *P. juniperinum*
- (1892). *P. macrophyllum*
- (1893), 391, 458. *P. Coryae*

†See notes on Liebmann and Oersted.

Wilkes Expedition

- *P. chrysocladon*
- *P. crassifolium*
- 1316. *P. longispicum*
- 1567. *P. densum*
- 1667, 1772. *P. villosum*

Wilkinson

- (1885). *P. Wilkinsoni*

Williams

- 178. *P. Brittonianum*
- 255. *P. piperoides*
- 428, 594. *P. crassifolium*
- 581. *P. bolivianum*

Wilson (see Britton)

- 1748. *P. antillarum*
- 7250, 7254, 7315, 7814, 7851, 7854.
- P. trinervium*
- 7449, 7457, 7532, 7579. *P. rubrum*

Wislizenus

- 41. *P. Cockerellii*

Wooton

- (1899, 1903), 127. *P. Coryae*
- (1900, 1909), 386, 2866. *P. juniperinum*
- (1902, 1906). *P. Cockerellii*

— & Standley

- (1906). *P. Coryae*

Wright

- (1853-6). *P. commutatum*
- (1853-6). *P. longispicum*
- 15. *P. Cockerellii*
- 216 pp., 217, 1251a. *P. piperoides*
- 216 pp., 437, 1251. *P. dichotomum*
- 438, 1252 pp. *P. racemosum*
- 452, 1302. *P. antillarum*
- 512, 1200b, 1300b. *P. rubrum*
- 630, 1787. *P. capitellatum*
- 632. *P. Havardianum*
- 1252 pp. *P. hexastichum*
- 1786. *P. Coryae*
- 1788. *P. juniperinum*
- 2650. *P. Gundlachii*

—, Parry & Brummel

- 458. *P. anceps*
- 459. *P. cerinocarpum*
- 460. *P. hexastichum*
- 464. *P. dichotomum*
- 465. *P. piperoides*
- 467. *P. antillarum*

Wuerttemberg—see Paul

Wullschlaegel

- *P. ceibanum*
- 256-7 *P. trinervium*
- 991. *P. piperoides*
- 1481. *P. racemosum*

B. OCCURRENCE

NORTH AMERICA

United States

Alabama

- P. flavescens*

Arizona

- P. californicum*
- *distans*
- *nanum*
- P. Coryae*
- P. densum*
- P. juniperinum*
- *nanum*
- P. macrophyllum*
- *circulare*
- *Jonesii*
- P. pauciflorum*

Arkansas

- P. flavescens*
- *orbiculare*

California

- P. californicum*
- *distans*
- P. coloradense*
- P. densum*
- *Parishii*
- P. Libocedri*
- P. ligatum*
- P. longispicum*
- *cyclophyllum*
- P. pauciflorum*
- P. villosum*
- *rotundifolium*

- | | |
|------------------------|-------------------------|
| Colorado | Oregon |
| <i>P. juniperinum</i> | <i>P. densum</i> |
| Delaware | <i>P. Libocedri</i> |
| <i>P. flavescens</i> | <i>P. ligatum</i> |
| District of Columbia | <i>P. villosum</i> |
| <i>P. flavescens</i> | Pennsylvania |
| Florida | <i>P. flavescens</i> |
| <i>P. Eatoni</i> | South Carolina |
| <i>P. flavescens</i> | <i>P. flavescens</i> |
| <i>P. macrotomum</i> | Texas |
| Illinois | <i>P. Bolleanum</i> |
| <i>P. flavescens</i> | <i>P. capitellatum</i> |
| Indiana | <i>P. Cockerellii</i> |
| <i>P. flavescens</i> | <i>P. Engelmanni</i> |
| Kentucky | — <i>Claviger</i> |
| <i>P. flavescens</i> | <i>P. flavescens</i> |
| Louisiana | — <i>orbiculare</i> |
| <i>P. flavescens</i> | <i>P. Havardianum</i> |
| — <i>orbiculare</i> | Utah |
| Maryland | <i>P. californicum</i> |
| <i>P. flavescens</i> | <i>P. juniperinum</i> |
| Mississippi | Virginia |
| <i>P. flavescens</i> | <i>P. flavescens</i> |
| Missouri | West Virginia |
| <i>P. flavescens</i> | <i>P. flavescens</i> |
| Nevada | Mexico |
| <i>P. californicum</i> | Lower California |
| — <i>distans</i> | <i>P. aureum</i> |
| <i>P. Libocedri</i> | <i>P. brachyphyllum</i> |
| <i>P. ligatum</i> | <i>P. californicum</i> |
| New Jersey | — <i>distans</i> |
| <i>P. flavescens</i> | <i>P. Diguetii</i> |
| New Mexico | <i>P. Eduardi</i> |
| <i>P. capitellatum</i> | <i>P. peninsulare</i> |
| <i>P. Cockerellii</i> | <i>P. saccatum</i> |
| <i>P. Coryae</i> | <i>P. tumidum</i> |
| <i>P. juniperinum</i> | <i>P. villosum</i> |
| North Carolina | Yucatan |
| <i>P. flavescens</i> | <i>P. Gaumeri</i> |
| Ohio | <i>P. vernicosum</i> |
| <i>P. flavescens</i> | <i>P. yucatanum</i> |
| Oklahoma | Mainland |
| <i>P. flavescens</i> | <i>P. amplifolium</i> |
| | <i>P. Bolleanum</i> |

Mexico, Mainland—continued

P. brachystachyum
P. brevifolium
P. californicum
— *distans*
P. calyculatum
— *filipes*
— *Gonzalezii*
— *occidentale*
P. capitellatum
P. carneum
P. Cockerellii
P. colipense
P. commutatum
P. Conzattii
— *tecomatlanum*
P. densum
P. Engelmanni
P. falcatum
P. Forestierae
P. Galeottii
P. globuliferum
P. Greggii
P. Guazumae
P. juniperinum
P. lanatum
P. lanceolatum
P. ligatum
P. longifolium
P. macrophyllum
P. mazatlanum
P. minutifolium
P. nervosum
P. Oliverianum
P. pachyarthron
P. Palmeri
P. piperoides
— *hexastichum*
P. Pringlei
P. puberulum
— *chihuahuense*
P. Purpusi
P. Reichenbachianum
P. Robinsonii
P. saltillense
P. scaberrimum
P. Schumanni

Mexico, Mainland—continued

P. tamaulipense
P. tequilense
P. thyrsoides
P. tlacolulense
P. tomentosum
P. velutinum
P. villosum
P. Wawrae
P. Wilkinsoni

Central America

Belize (British Honduras)

P. crassifolium Pittieri
P. piperoides

Costa Rica

P. annulatum
P. ceibanum
P. crassifolium Pittieri
P. Cooperi
P. crispum
P. gracilispicum
P. Heydeanum
P. piperoides
P. quinquenervium
P. Rensoni
P. robustissimum
— *simulans*
P. supravenuosum
P. Tonduzii

Guatemala

P. annulatum
P. cheirocarpum
P. falcifolium
P. Heydeanum
P. multiflorum
P. piperoides
P. robustissimum simulans
P. Rondeletiae
P. supravenuosum
P. uspanthanum
P. velutinum
P. vulcanicum
P. zacapanum

Honduras (see Belize)

P. commutatum
P. decussatum

Nicaragua

- P. ceibanum*
- P. commutatum*
- P. piperoides*
- P. robustissimum simulans*
- P. supravenuosum*

Panama

- P. corynthron*
- P. gracilispicum*
- P. venezuelense*
- P. piperoides*

Salvador

- P. Rensoni*
- P. robustissimum simulans*

SOUTH AMERICA

Argentina

- P. argentinum*
- P. Hieronymi*
- P. Liga*
- P. Meliae*
- P. piperoides*
- P. pruinatum*
- P. tucumanense*

Bolivia

- P. angustifolium*
- P. bathyoryctum*
- P. bolivianum*
- P. Brittonianum*
- P. crassifolium*
- P. Kuntzei*
- P. Liga*
- P. Mandonii*
- P. Meliae*
- P. semiteres*
- P. undulatum*

Brazil

- P. acinacifolium*
- P. affine*
- P. amplexicaule*
- P. bathyoryctum*
- P. Caesalpiniae*
- P. campinense*
- P. caripense*
- P. cearense*
- *minor*
- P. chrysocladon*

Brazil—continued

- P. congestum*
- P. coriaceum*
- *quintense*
- P. craspedophylloides*
- P. craspedophyllum*
- P. crassifolium*
- *multiflorum*
- *parvifolium*
- P. Crulsii*
- P. dipterum*
- P. emarginatum*
- P. ensifolium*
- P. fragile*
- P. Gardnerianum*
- P. Glaziovii*
- P. habrostachyum*
- P. holaxanthum*
- *corallispicum*
- P. lanceolato-ellipticum*
- P. laxiflorum*
- P. linearifolium*
- P. macrarthrum*
- P. Martianum*
- P. microphyllum*
- P. minor*
- P. multifoveolatum*
- P. nitidum*
- P. pellucidulum*
- P. piauhyanum*
- P. piperoides*
- *compositum*
- P. platycaulon*
- P. productipes*
- P. pteroneuron*
- P. Selloi*
- P. stenophyllum*
- P. stronglylados*
- P. tunaeforme*
- P. ulophyllum*
- P. undulatum*
- P. Warmingii*
- P. Wiesnerianum*

Cayenne (French Guiana)

- P. Perrottetii*
- P. piperoides*

Cayenne—continued

- P. platycaulon
- P. racemosum

Colombia

- P. avenium
- P. Briquetianum
- P. Degenianum
- P. exiguum
- P. gracilispicum
- P. Herbert-Smithii
- P. Holtonis
- P. Lindeni
- P. piperoides
- P. quadrangulare
- P. sanctae-martae
- P. Trianae
- P. turbinispicum
- P. venezuelense

Demerara (British Guiana)

- P. apertum
- P. Appuni
- P. carinatum
- P. crassifolium
- P. demerarae
- P. essequibense
- P. Jenmani
- P. obtusissimum
- P. Perrottetii
- P. piperoides
- P. racemosum

Ecuador

- P. amplectens
- P. Eggersii
- P. membranaceum
- P. obliquum
- P. parietarioides
- P. piperoides
- P. quadrangulare
- P. trisulcatum
- P. Verleyseni
- chimboense
- Fraseri
- P. viscifolium

Guiana

- British—see Demerara
- Dutch—see Surinam
- French—see Cayenne

Paraguay

- P. acinacifolium
- P. Balansae
- Hassleri
- Morongi
- P. Casimiranum
- P. hypericifolium
- P. Liga
- P. Meliae
- P. obovatifolium
- P. piperoides
- P. reductum

Peru

- P. angustifolium
- P. Englerianum
- P. Ernstianum
- P. huallagense
- P. Lindavianum
- P. Mathewsi
- P. obliquum
- P. peruvianum
- P. semiteres
- P. Urbanianum

Surinam (Dutch Guiana)*

- P. dimidiatum
- P. obtusissimum
- P. piperoides
- P. racemosum
- P. surinamense

Uruguay

- P. falcifrons

Venezuela

- P. bilineatum
- P. caracasenum
- P. cuneifolium
- P. cymosum
- P. Fendlerianum
- P. gracilispicum
- P. granaticolum

*A specimen apparently of *Viscum album* (Splitgerber, 336, Apr. 13, 1858) occurs as sheet no. 600670 of the Leiden herbarium "Ad ramos arborum varium in sylvis Surinami prope flum. Saramaccam. Planta tota flavescenti, fructibus luteis."

Venezuela—continued

- P. Johnstoni*
- P. Knoopii*
- P. longipetiolatum*
- P. Lyoni*
- P. Ottonis*
- P. ovalifolium*
- P. pachyphyllum*
- P. paradoxum*
- P. piperoides*
- P. polygynum*
- P. racemosum*
- P. rigidum*
- P. towarensis*
- P. tubulosum*
- P. venezuelense*

WEST INDIES

Acklin

- P. trinervium*

Andros

- P. Northropiae*
- P. racemosum*

Antigua

- P. antillarum*
- P. trinervium*

Cat

- P. rubrum*

Crooked

- P. rubrum*

Cuba

- P. antillarum*
- *orientale*
- P. dichotomum*
- P. Gundlachii*
- P. hexastichum*
- P. piperoides*
- P. racemosum*
- P. rubrum*

Dominica

- P. chrysocarpum*
- P. flavens australe*
- P. Herminieri*
- P. piperoides*
- P. trinervium*

Fortune

- P. rubrum*

Great Ragged

- P. trinervium*

Grenada

- P. hexastichum*
- *angustifolium*
- P. piperoides*

Guadeloupe

- P. chrysocarpum*
- P. Dussii*
- P. Herminieri*
- P. hexastichum*
- P. martinicense*
- P. mucronatum*
- P. piperoides*
- P. trinervium*

Haiti (see Sto. Domingo)

- P. antillarum*
- P. dichotomum*
- P. haitense*
- P. hexastichum*
- P. mucronatum*
- P. piperoides*
- P. racemosum*

Inagua

- P. rubrum*

Jamaica

- P. Campbellii*
- P. crenulatum*
- P. domingense*
- P. Fici*
- P. flavens*
- P. gracile*
- *Ballii*
- P. Grisebachianum*
- P. piperoides*
- P. tetrapterum*
- P. Wattii*
- *productum*

Long

- P. rubrum*

Martinique

- P. chrysocarpum*
- P. hexastichum*
- P. martinicense*
- P. mucronatum*
- P. piperoides*

Martinique—continued

- P. tetrapterum*
- P. trinervium*

Montserrat

- P. trinervium*

Mustique

- P. trinervium*

Puerto Rico

- P. anceps*†
- P. antillarum*
- P. chrysocarpum*
- P. Helleri*
- P. hexastichum*
- P. racemosum*
- P. tetrapterum*
- P. trinervium*

Saba

- P. trinervium*

S. Barthélemy

- P. trinervium*

S. Croix

- P. chrysocarpum*

S. Domingo (see Haiti)

- P. anceps*
- P. antillarum*
- P. cerinocarpum*
- P. dichotomum*
- *ovatifolium*
- P. Helleri sanguineum*
- P. hexastichum*
- P. mucronatum*
- P. piperoides*
- P. racemosum*

S. Eustatius

- P. trinervium*

S. Thomas

- P. chrysocarpum*
- P. trinervium*

S. Vincent

- P. chrysocarpum*
- P. flavens australe*
- P. hexastichum*
- P. piperoides*
- P. trinervium*

Tobago

- P. piperoides*

Trinidad

- P. flavens australe*
- P. Hartii*
- P. martinicense*
- P. piperoides*
- P. trinervium*
- P. venezuelense*

Watling

- P. rubrum*
- P. trinervium*

PACIFIC ISLANDS

Galapagos Isl.

- P. galapageium*
- P. Henslovii*
- P. uncinatum*

Guadalupe Isl.

- P. guadalupense*

Revillagigedo Isl

- P. Townsendi*

C. SPECIES EXCLUDED

Phoradendron aequatoris Urban

Dendrophthora aequatoris n. nom.

P. arcuatum Wright

Dendrophthora arcuata

P. auriculatum

P. buxifolium Grisebach

Dendrophthora buxifolia

P. buxifolium rotundatum Grisebach

D. buxifolia rotundata

P. chrysostachyum Eichler

Dendrophthora chrysostachya

P. clavatum Eichler

Dendrophthora clavata

P. clavatum Kirk

“*Viscum clavatum*”

P. constrictum Grisebach

Dendrophthora constricta

P. cordifolium Eichler

Oryctanthus cordifolia

P. crassuloides Eichler

Dendrophthora crassuloides

P. ellipticum Eichler

Dendrophthora elliptica

Phoradendron—continued

- P. globuliflorum* Eichler
Dendrophthora chrysostachya
P. inaequidentatum Rusby
Dendrophthora inaequidentata n. nom.
P. leptostachyum Index Kewensis
Dendrophthora flagelliformis
P. leucocarpum Patschovsky
Dendrophthora leucocarpa n. nom.
P. ligustrinum Eichler
Oryetanthus ligustrina n. nom.
P. linifolium Eichler
P. macrostachyum Grisebach
Dendrophthora flagelliformis
D. macrostachya
P. macrostachyum f. *parvifolia*
 Grisebach
Dendrophthora serpyllifolia
P. mesembryanthemifolium Grisebach
Dendrophthora mesembryanthemifolia
P. myrtilloides Grisebach
Dendrophthora elliptica
D. myrtilloides

Phoradendron—continued

- P. paucifolium* Rusby
P. Pearcei Rusby
P. roraimae Oliver
Dendrophthora roraimae n. nom.
P. Rusbyi Britton
Dendrophthora Rusbyi n. nom.
P. serpyllifolium Grisebach
Dendrophthora serpyllifolia
P. serpyllifolium aphyllum Gray
Dendrophthora cupressoides
P. sessilifolium Grisebach
Dendrophthora sessilifolia
P. squamigerum Eichler
Dendrophthora squamigera
P. squamigerum Oliver
Dendrophthora biserrula
P. subtrinerve Rusby
Dendrophthora subtrinervis n. nom.
P. tafallaecoides Rusby
P. testifolium Wright
Dendrophthora constricta
P. tetrastachyum Grisebach
Dendrophthora grandifolia
P. torulosum Eichler

D. NAMES*

(Synonyms in parenthesis)

- Allobium* (19)
Baratostachys (19)
Castrea falcata (6)
Dendrophthora aequatoris 217
arcuata 217
biserrula 218
buxifolia 217
 — *rotundata* 217
chrysostachya 217, 218
clavata 217
constricta 217, 218
crassuloides 217
cupressoides 218
elliptica 217, 218

- Dendrophthora*—continued
flagelliformis 218
grandifolia 218
inaequidentata 218
leucocarpa 218
macrostachya 218
mesembryanthemifolia 218
myrtilloides 218
roraimae 218
Rusbyi 218
serpyllifolia 218
sessilifolia 218
squamigera 218
subtrinerve 218

*The number after a name, followed by a colon, is that of its group of species.

Dendropemon domingensis (102)
Loranthus angustifolius (65)
 domingensis (102)
 piperoides (146, 184)
 quadrangularis (108, 178)
 sessilis (104)
 torulosus (146, 184)
 viseifolius (109, 178)
Oryctanthus cordifolia 217
 ligustrina 218
Phoradendron acinacifolium 25: 12,
 91, 92, 175
 aequatoris=*Dendrophthora*
 affine 31: 9, 108, 113, 179
 amplectens 16: 70, 75, 172
 amplexicaule 16: 9, 70, 74, 172
 amplifolium 9: 58, 59, 170
 anceps 28: 97, 98, 176
 angustifolium 13: 65, 170
 annulatum 9: 58, 169
 antillarum 31: 14, (107), 108, 111,
 178
 — *longum* 112, 178
 — *orientale* 112, 178
 apertum 30: 102, 104, 177
 Appuni 30: 102, 104, 177
 arcuatum=*Dendrophthora*
 argentinum 33: 56, 120, 121, 180
 auriculatum=?
 aureum 4: 45, 49, 168
 avenium 42: 131, 133, 182
 Balansae 42: 131, 132, 182
 — *Hassleri* 132, 182
 — *Morongi* 132, 182
 bathoryctum 23: 87, 88, 174
 Berterianum (158, 186)
 bilineatum 20: 83, 84, 174
 Biolleyi (146)
 bolivianum 46: 137, 138, 183
 Bolleanum 2: 14, 25, 26, 166
 brachyphyllum 4: 45, 49, 168
 brachystachyum 4: 45, 47, 168
 brevifolium 17: 76, 172
 Briquetianum 21: 85, 86, 174
 Brittonianum 46: 10, 137, 139, 183
 buxifolium=*Dendrophthora*

Phoradendron—continued
 Caesalpiniae 52: 148, 150, 185
 californicum 1: 7, 11, 12, 14, 20,
 165
 — *argenteum* 21
 — *distans* 21, 165
 — *nanum* 21, 165
 calyculatum 8: 7, 54, 169
 — *filipes* 54, 169
 — *Gonzalezi* 54, 169
 — *occidentale* 54
 Campbellii 27: 95, 96, 175
 campinense 55: 158, 160, 186
 capitellatum 2: 25, 165
 caracasenum 32: 116, 120, 180
 carinatum 46: 137, 139, 183
 caripense 19: 79, 80, 173
 carneum 9: 8, 58, 60, 170
 Casimiranum 16: 70, 71, 171
 cayennense (137)
 cearense 32: 116, 119, 180
 — *minor* 120, 180
 ceibanum 31: 108, 110, 178
 cerinocarpum 46: 137, 139, 183
 cheiroparpum 26: 93, 94, 175
 chrysocarpum 28: 12, 97, 98, 176
 chrysocladon 53: 9, 151, 152, 185
 chrysostachyum=*Dendrophthora*
 clavatum=*Dendrophthora*
 Cockerellii 3: 30, 38, 164, 167
 colipense 3: 30, 37, 167
 coloradense 3: 30, 39, 167
 commutatum 30: 12, 103, 106, 177
 congestum 19: 79, 80, 173
 constrictum=*Dendrophthora*
 Conzattii 11: 61, 63, 170
 — *nochixtlanense* 64, 170
 — *tecomatlanum* 64, 170
 Cooperi 14: 56, 66, 67, 171
 cordifolium=*Oryctanthus*
 coriaceum 19: 79, 81, 173
 — *quintense* 82, 173
 Coryae 3: 30, 43, 164, 165, 168
 corynarthron 14: 66, 171
 craspedophylloides 25: 91, 92, 175
 craspedophyllum 24: 13, 89, 91, 143,
 175

Phoradendron—continued

- crassifolium 50: 13, 144, 183
- multiflorum 145, 184
- parvifolium 145
- Pittieri 145, 184
- crassuloides=Dendrophthora
- crenulatum 28: 97, 101, 176
- crispum 17: 76, 77, 172
- Crulsii 16: 70, 74, 172
- cuneifolium 32: 10, 116, 119, 180
- cymosum 55: 8, 10, 158, 159, 186
- decussatum 26: 93, 94, 175
- Degenianum 32: 116, 119, 180
- demerarae 16: 70, 73, 172
- densum 2: 7, 25, 27, 166
- Parishii 28, 166
- dichotomum 55: 158, 186
- ovatifolium 159, 186
- Diguetii 4: 45, 49, 168
- dimidiatum 23: 87, 174
- dipterum 16: 8, 70, 71, 171
- domingense 29: 11, 102, 177
- Dussii 28: 97, 100, 176
- Eatonii 3: 13, 30, 33, 34, 166
- Eduardi 4: 45, 46, 168
- Eggersii 39: 8, 9, 12, 128, 143, 156, 183
- ellipticum=Dendrophthora
- emarginatum 32: 10, 12, 56, 116, 179
- minor (117)
- Engelmanni 3: 5, 30, 35, 164, 166, 167
- Claviger 35, 164, 167
- Englerianum 42: 131, 133, 182
- ensifolium 35: 124, 180
- Ernstianum 33: 120, 121, 180
- essequibense 52: 148, 149, 184
- exiguum 19: 79, 81, 173
- falcatum 12: (8, 10, 54) 64, 65, 170
- falcifolium 18: 77, 79, 172, 181
- falcifrons 37: 126
- Fendlerianum 49: 142, 143, 183
- Fiei 27: 9, 95, 175
- flavens 53: 8, 9, 13, 151, (152), 154, 185

Phoradendron—continued

- australe 155
- flavescens 3: (35, 47, 101), 3, 9, 10, 11, 12, 14, 15, 16, 29, 30, 164, 166
- glabriusculum (30)
- macrophyllum (37, 38)
- orbiculatum 33, 164, 166
- pubescens (35, 37)
- quinquenervium (40, 167)
- tomentosum (36)
- villosum (40)
- flavum (33, 152)
- florianum (160)
- Forestierae 10: 60, 61, 170
- fossile 15
- fragile 47: 9, 13, 140, 141, 183
- galapageium 55: 158, 159, 186
- Galeottii 4: 45, 46, 168
- Gardnerianum 52: 148, 184
- Gaumeri 31: 108, 114, 179
- Giordanæ (158, 186)
- glandulosum (137)
- Glaziovii 16: 70, 74, 143, 172
- globuliferum 4: 45, 48, 168
- globuliflorum=Dendrophthora
- gracile 31: 56, 108, 112, 179
- Ballii 113, 179
- gracilispicum 41: 130, 181
- granaticolum 15: 68, 70, 171
- Greggii 3: 30, 36, 167
- Grisebachianum 27: 12, 95, 96, 176
- guadalupense 2: 25, 29, 166
- Guazumae 30: 103, 104, 177
- Gundlachii 28: 97, 101, 176
- habrostachyum 19: 79, 82, 173
- Hahnii (51)
- haitense 28: 97, 99, 176
- Hartii 28: 97, 98, 176
- Havardianum 3: 30, 44, 168
- Helleri 28: 97, 100, 176
- sanguineum 100, 176
- Henslovii 55: 158, 159, 186
- Herbert-Smithii 19: 79, 80, 173
- Herminieri 41: 130, 131, 181
- hexastichum 45: 11, 135, (136, 138), 182

Phoradendron—continued

- angustifolium 136, 182
- latifolium (137)
- longispicum (138, 183)
- Heydeanum 44: 135, 182
- Hieronymi 34: 122, 123, 180
- holoxanthum 24: 89, 175
- corallispicum 90, 175
- Holtonis 55: 158, 161, 186
- huallagense 54: 156, 157, 186
- hypericifolium 16: 70, 72, 171
- inaequidentatum=Dendrophthora
- Jenmani 20: 83, 85, 143, 156, 174
- Johnstoni 52: 148, 149, 185
- juniperinum 1: 7, 12, 13, 20, 22, 24, 164, 165
- Libocedri (23)
- nanum 23, 165
- Knoopii 53: 151, 152, 185
- Kuntzei 38: 14, 127, 181
- lanatum 4: 45, 168
- lanceolato-ellipticum 35: 57, 124, 125, 181
- lanceolatum 12: 64, 170
- latifolium (5, 9, 15, 131, 146)
- laurifolium (146)
- laxiflorum 54: 11, 56, 143, 156, 157, 186
- leptostachyum=Dendrophthora
- leucocarpum=Dendrophthora
- Libocedri 1: 7, 10, 20, 23, 164, 165
- Liga 34: 122, 180
- ligatum 1: 24, 164, 165
- ligustrinum=Oryetantes
- Lindavianum 53: 11, 151, 155, 186
- Lindeni 55: 158, 161, 186
- linearifolium 35: 124, 143, 180
- linifolium=?
- longifolium 7: 52, 53, 169
- longipetiolatum 20: 143, 174
- longispicum 3: 30, 39, 167
- cyclophyllum 40
- Lyoni 32: 116, 179
- macrarthron (125)
- macrarthrum 36: 125, 181
- macrophyllum 3: 7, 30, 37, (38), 164, 165, 167

Phoradendron—continued

- circulare 38, 167
- Jonesii 38
- macrostachyum=Dendrophthora
- macrothomum 3: 10, 30, 34, 164, 166
- Mandonii 42: 131, 132, 182
- Martianum 31: 108, 114, 179
- martinicense 50: (97), 144, 145, 184
- Mathewsi 42: 131, 133, 182
- mazatlanum 4: 45, 47, 168
- Meliae 33: 120, 121, 180
- membranaceum 53: 151, 153, 185
- mesembryanthemifolium=Dendrophthora
- microphyllum 31: 108, 113, 179
- minor 32: 116, 117, 179
- minutifolium 2: 13, 25, 165
- mucronatum 32: 116, 118, 179
- multiflorum 9: 58, 59, 169
- multifoveolatum 16: 70, 71, 171
- myrtilloides=Dendrophthora
- nervosum 11: 61, 63, 165, 170
- nitidum 24: 89, 90, 175
- Northropiae 40: 129, 156, 181
- obliquum 22: 86, 143, 156, 174
- oblongifolium (103)
- obovatifolium 32: 116, 117, 179
- obtusissimum 25: 91, 92, 175
- Oliverianum 45: 135, 136, 182
- orbiculatum (34)
- Ottonis 32: 116, 118, 180
- ovalifolium 20: 83, 173
- pachyarthron 11: 61, 62, 170
- pachyphyllum 53: 151, 185
- Palmeri 4: 12, 45, 46, 168
- paradoxum 49: 8, 13, 142, 183
- parietarioides 13: 65, 66, 171
- pauciflorum 2: 25, 28, 166
- paucifolium=?
- Pearcei=?
- pellucidulum 24: 89, 175
- peninsulare 4: 45, 50, 169
- pennivenium (137)
- pepericarpum (144, 183)
- Perrottetii 23: 87, 88, 174
- parvifolia (88)
- peruvianum 42: 8, 9, 131, 182

Phoradendron—continued

- piauhyanum 31: 108, 110, 178
 piperoides 51: 17, 145, 184
 — compositum 148
 — hexastichum 148
 platycaulon 52: 8, 148, 150, 185
 polygynum 21: 10, 85, 128, 174
 Pringlei 10: 60, 170
 productipes 46: 137, 138, 183
 pruinose 34: 122, 180
 pteroneuron 46: 137, 140, 183
 puberulum 3: 30, 42, 168
 — chihuahuense 43, 168
 Purpusi 11: 61, 62, 170
 quadrangulare 31: (106, 111), 15, 108, 178
 — avenium (133)
 quinquenervium 53: 151, 153, 185
 racemosum 46: 8, 9, 136, 143, 156, 182
 reductum 25: 91, 93, 175
 Reichenbachianum 18: (63), 77, 78, 172
 Rensoni 30: 103, 105, 177
 reticulatum (185)
 rigidum 20: 83, 84, 174
 Robinsonii 5: 12, 51, 169
 — Hindsii 51, 169
 robustissimum 18: 9, 77, 78, 173
 — simulans 78, 173
 Rondeletiae 17: 76, 172
 roraimae=Dendrophthora
 rubrum 30: (106, 111, 114), 8, 12, 13, 15, 103, 107, 178
 — brevispicum (103)
 — latifolium (103)
 — longifolium (80)
 — longispicum (110)
 — microphyllum (113)
 rugulosum (182)
 Rusbyi=Dendrophthora
 saccatum 4: 45, 50, 169
 salicifolium (108)
 saltillense 2: 25, 27, 165
 sanctae-martae 30: 103, 105, 177
 scaberrimum 7: 52, 169
 Schottii (146)

Phoradendron—continued

- Schumanni 11: 61, 62, 170
 Selloi 24: 89, 90, 175
 semiteres 15: 68, 69, 171
 serpyllifolium=Dendrophthora
 sessilifolium=Dendrophthora
 spathulifolium (178)
 squamigerum=Dendrophthora
 stenophyllum 19: 79, 81, 173
 strongylocados 52: 148, 149, 185
 subtrinerve=Dendrophthora
 supravenuosum 53: 151, 154, 185
 surinamense 52: 148, 150, 185
 tafallaecoides=?
 tamaulipense 21: 108, 115, 179
 tequilense 2: 25, 26, 166
 tereticaule (146)
 testifolium=Dendrophthora
 tetrapterum 16: 8, 70, 72, 172
 tetrastachyum=Dendrophthora
 — spathulifolium (107, 178)
 tetrastichus (107)
 thyrsoideum 3: 30, 36, 167
 thacoulense 4: 45, 48, 168
 tomentosum 3: 30, 42, (51), 167
 Tonduzii 14: 66, 67, 171
 torulosum=?
 tovarense 16: 70, 73, 172
 Townsendi 31: 56, 108, 112, 179
 Trianae 15: 68, 171
 trinervium 30: 8, 11, 12, 102, 103, (105), 177
 trisulcatum 53: 151, 155, 185
 tubulosum 15: 68, 171
 tucumanense 38: 127, 181
 tumidum 4: 45, 49, 168
 tunaeforme 48: 13, 141, 183
 turbinispicum 16: 70, 75, 172
 ulophyllum 19: 79, 82, 173
 uncinatum 55: 158, 160, 186
 undulatum 41: 9, 130, 181
 Urbanianum 53: 151, 155, 185
 uspantanum 7: 52, 53, 169
 velutinum 6: 51, 169
 venezuelense, 31: 106, 108, 111, 178
 Verleyseni 15: 68, 69, 171
 — chimboense 69, 171

Phoradendron—continued

- *Fraseri* 69
- vernicosum* 26: 8, 93, 95, 175
- villosum* 3: 10, 12, 30, 40, 164, 165, 167
- *rotundifolium* 42, 167
- viscifolium* 31: 108, 109, 178
- vulcanicum* 17: 76, 77, 172
- Warmingii* 43: 134, 182
- Wattii* 28: 10, 97, 99, 143, 176
- *productum* 100, 176
- Wawrae* 26: 93, 94, 175
- Wiesnerianum* 31: 108, 109, 178
- Wilkinsoni* 3: 30, 44, 168
- yucatanum* 32: 116, 118, 180
- zacapanum* 31: 108, 115, 179
- Zuloagae* 30: 103, 105, 165, 177

Phoradendrum anceps (98)

- annulatum* (58)
- argenteum* (121)
- bilineatum* (84)
- Campbellii* (96)
- caracasatum* (120)
- carneum* (60)
- chrysocarpum* (97)
- *Dussii* (100)
- coriaceum quintense* (82)
- crassifolium* (144)
- crenulatum* (101)
- Crulsii* (74)
- cuneifolium* (119)
- cymosum* (159)
- dichotomum* (158)
- dimidiatum* (87)
- Eggersii* (128)
- Fici* (95)
- flavens* (154)
- Gardnerianum* (148)
- Glaziovii* (74)
- Grisebachianum* (96)
- Gundlachii* (101)
- haitense* (99)
- Hartii* (98)
- hexastichum* (135, 136)
- *angustifolium* (136)
- Kuntzei* (127)
- latifolium* (146)

Phoradendrum—continued

- *hexastichum* (148)
- Liga* (122)
- longipetiolatum* (84)
- mucronatum* (118)
- obliquum* (86)
- obtusissimum* (92)
- ovalifolium* (83)
- pachyarthron* (62)
- paradoxum* (142)
- pruinatum* (122)
- quadrangulare* (108)
- *gracile* (112)
- racemosum* (137)
- reticulatum* (152)
- rigidum* (84)
- rubrum* (111)
- rugulosum* (134)
- spathulifolium* (107)
- tetrapterum* (72)
- tlacolulense* (48)
- tovarense* (73)
- trinervium* (103)
- *domingense* (102)
- tubulosum* (68)
- tucumanense* (127)
- undulatum* (130, 131)
- Wattii* (99)

Phthirusa domingensis (102)

Spiciviseum polygnum (85, 174)

Viscum affine (113, 179)

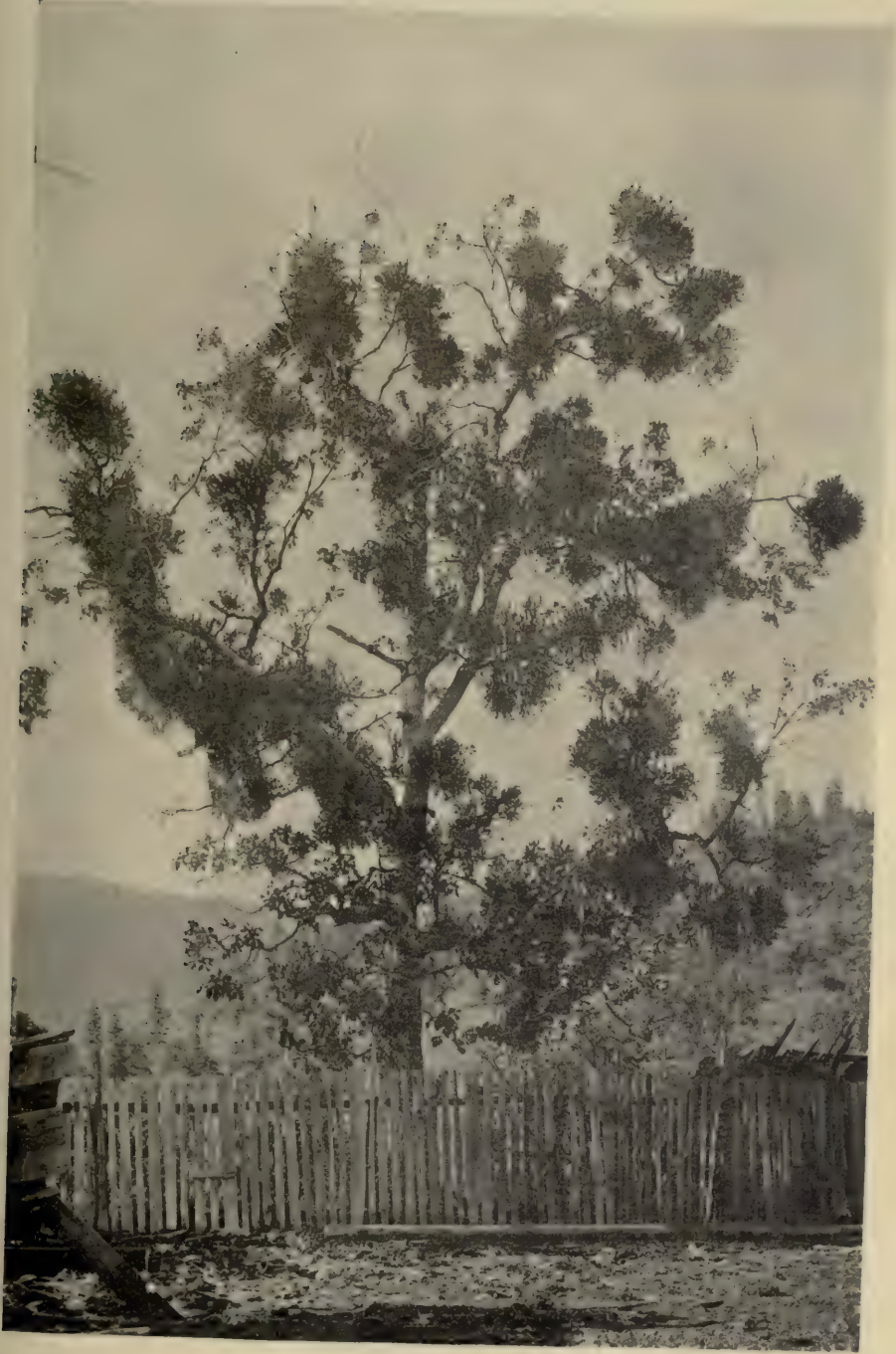
- album* (33) 215
- anceps* (98, 176)
- angustifolium* (65, 111)
- articulatum* (141, 183)
- Berterianum* (158, 186)
- Bolleanum* (26)
- brachystachyum* (47, 168)
- clavatum* (217)
- cornifolium* (146, 148, 184)
- crassifolium* (144, 183)
- dichotomum* (158, 186)
- dimidiatum* (87, 174)
- egense* (145)
- ellipticum* (146, 184)
- ensifolium* (124, 180)
- falcatum* (8, 10, 54, 65, 169)

Viscum—continued

- falcifrons (126, 181)
- flavens (33, 154)
- flavescens (30, 32)
- florianum (160)
- Fockeanum (146)
- galapageium (159, 186)
- glandulosum (137, 182)
- Henslovii (159, 186)
- hexastichum (135, 182)
- interruptum (125, 181)
- jamaicense (103)
- Kunthianum (109)
- lanceolato-ellipticum (125, 181)
- latifolium (137, 145)
- laurifolium (146, 184)
- leucarpum (30, 33)
- leucocarpum (30)
- Liga (122, 180)
- longifolium (53)
- macrophyllum (137, 154, 182)
- martinicense (145, 184)
- microphyllum (113, 179)
- mimosearum (42)
- mucronatum (118)
- myrtilloides (103, 136, 177)
- nitidum (90, 175)
- obliquum (86, 174)
- oblongifolium (31, 33, 103, 104, 177)

Viscum—continued

- obtusissimum (92, 175)
- ochroleucum (30, 32)
- pennivenium (137)
- Perrottetii (88, 174)
- piperoides (146)
- purpureum (33, 166)
- quadrangulare (108)
- racemosum (137)
- Reichenbachianum (25, 78)
- rubrum (107, 178)
- rugosum (31, 32)
- salicifolium (108, 178)
- saururoides (146, 184)
- Schiedeanum (65)
- Schottii (146, 184)
- serotinum (30, 32, 33, 166)
- stenophyllum (65)
- tetragonum (103)
- tereticaule (146)
- cubense (146, 184)
- teretifolium (146)
- tomentosum (42)
- trigonum (103)
- trinervium (103, 177)
- tunaeforme (141, 183)
- undulatum (130, 181)
- velutinum (51, 169)
- verticillatum (31)
- villosum (40)



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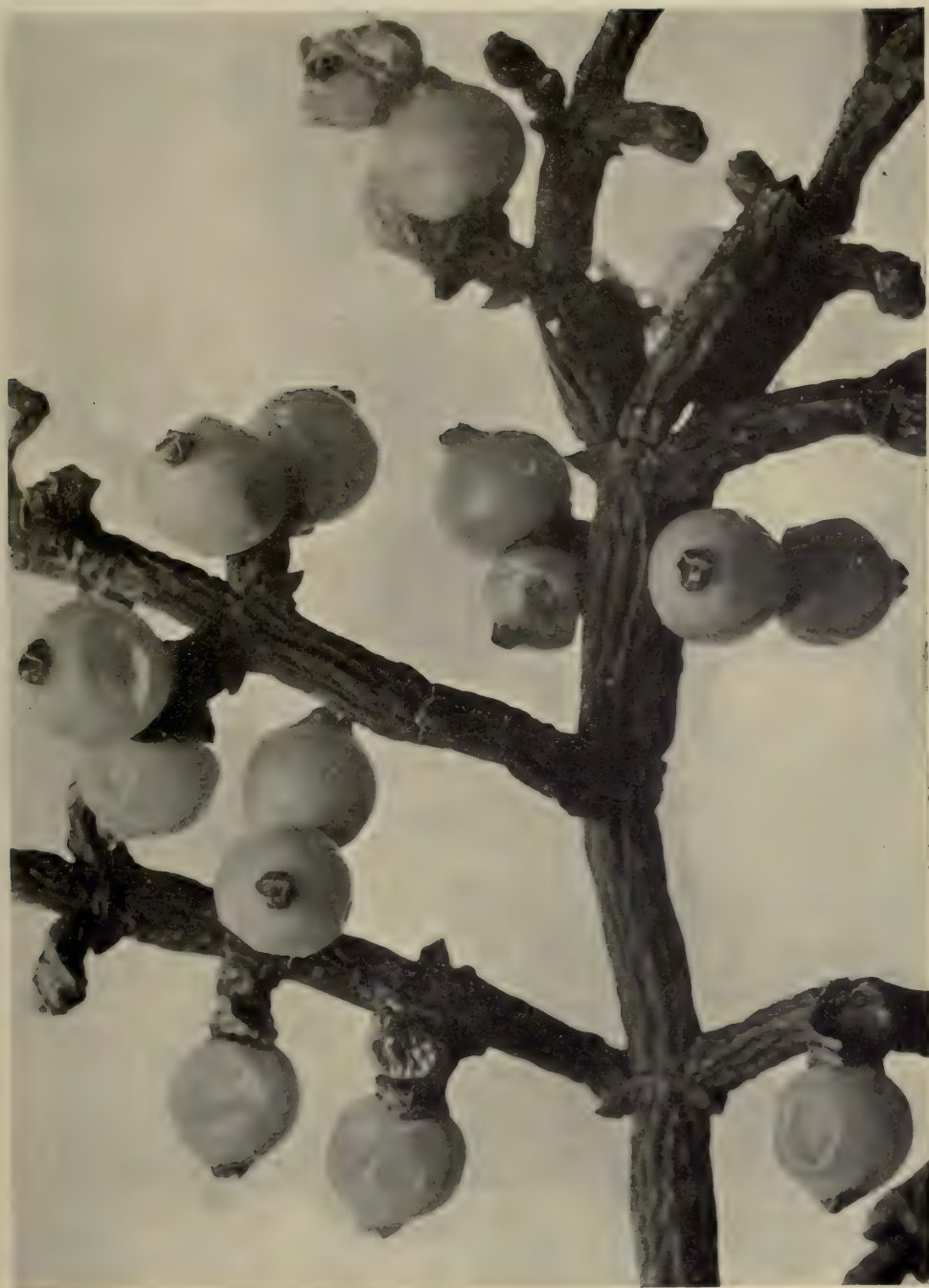
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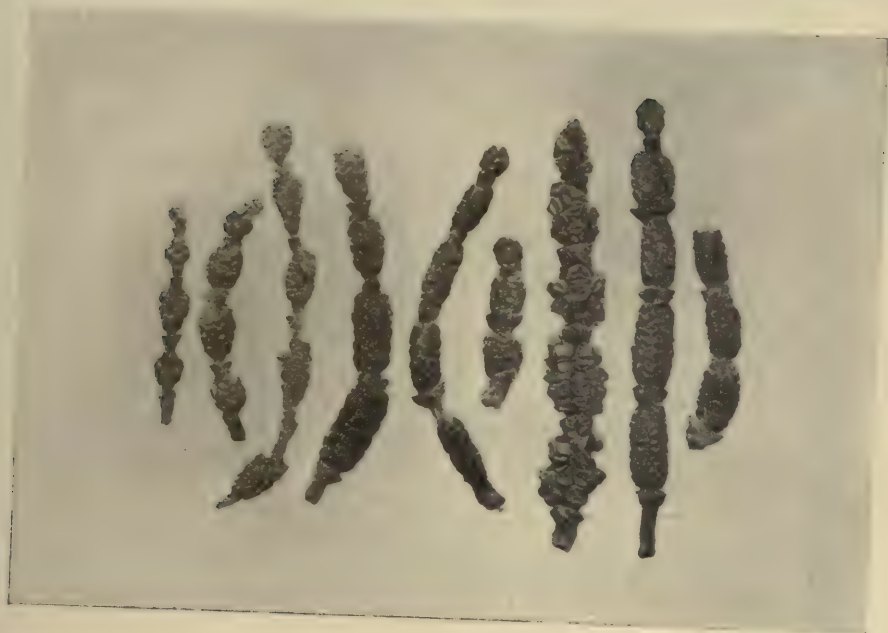
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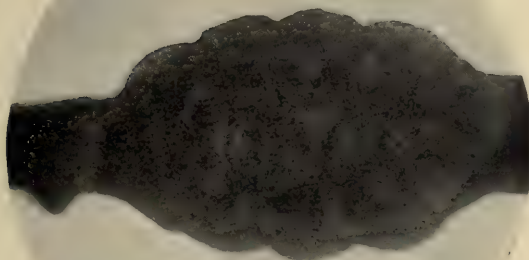
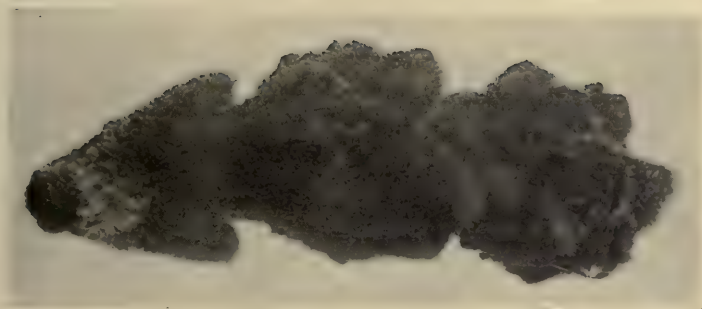
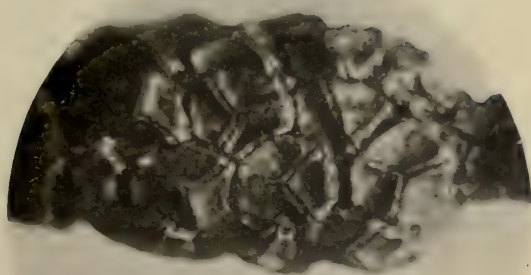
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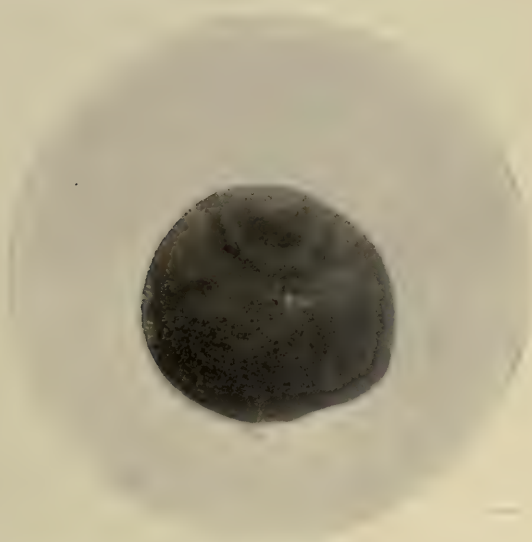


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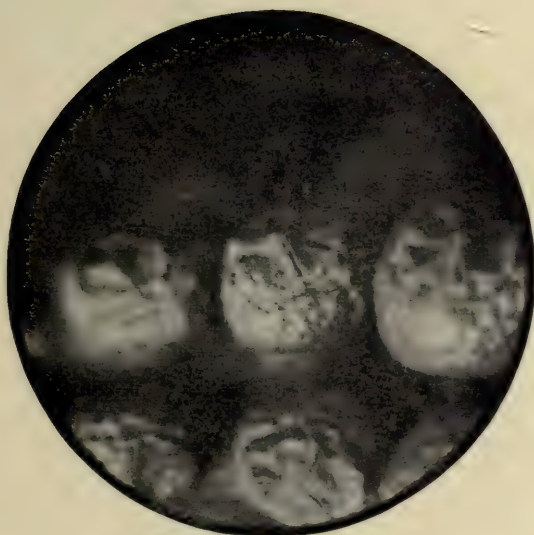


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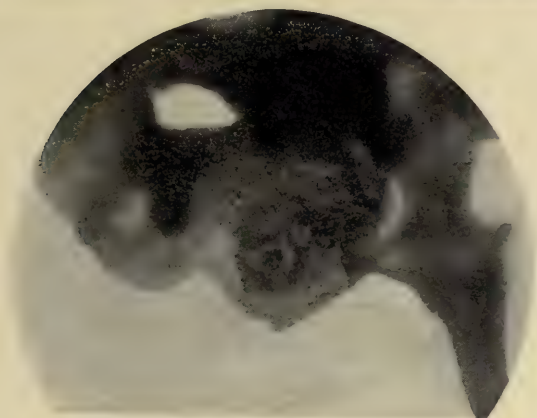
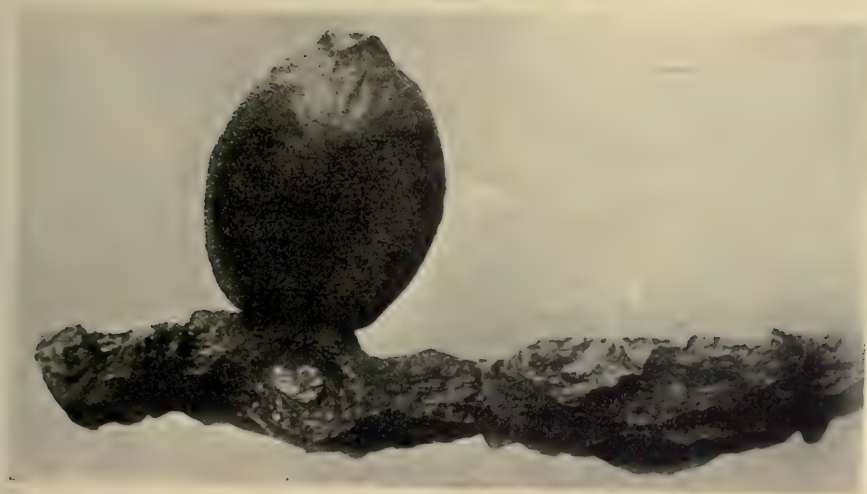
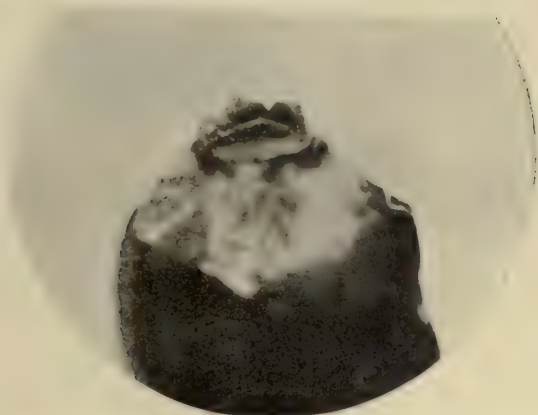




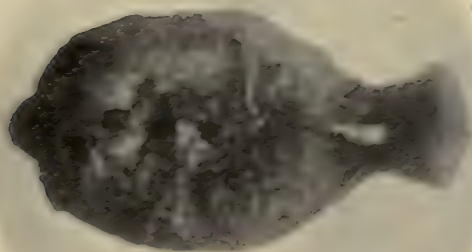
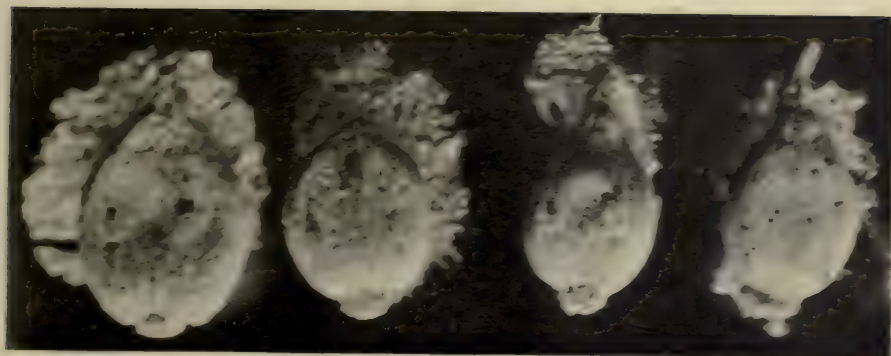
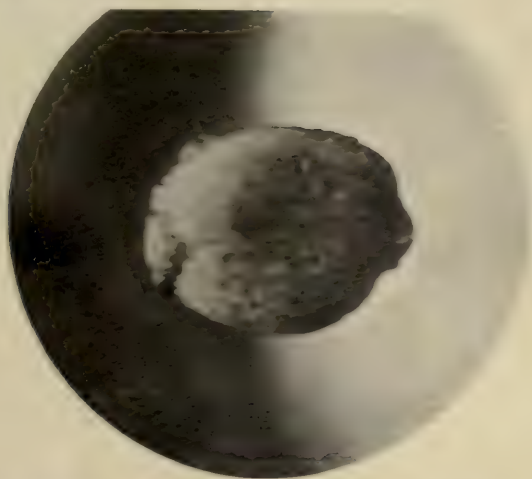
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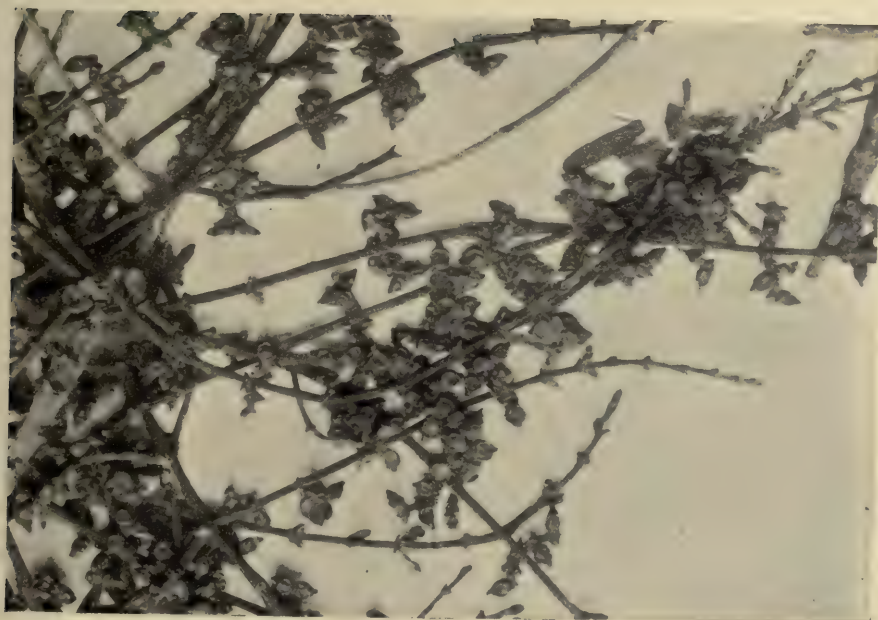
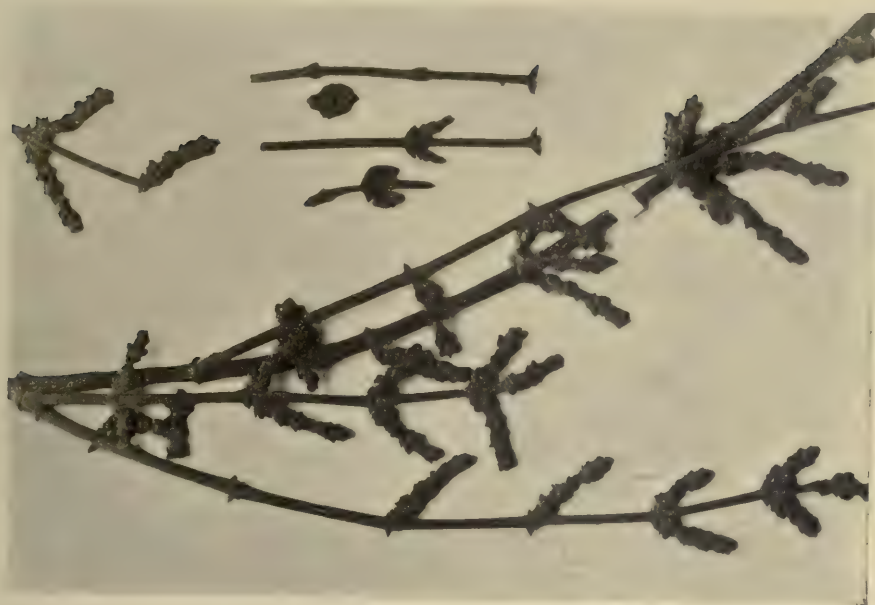
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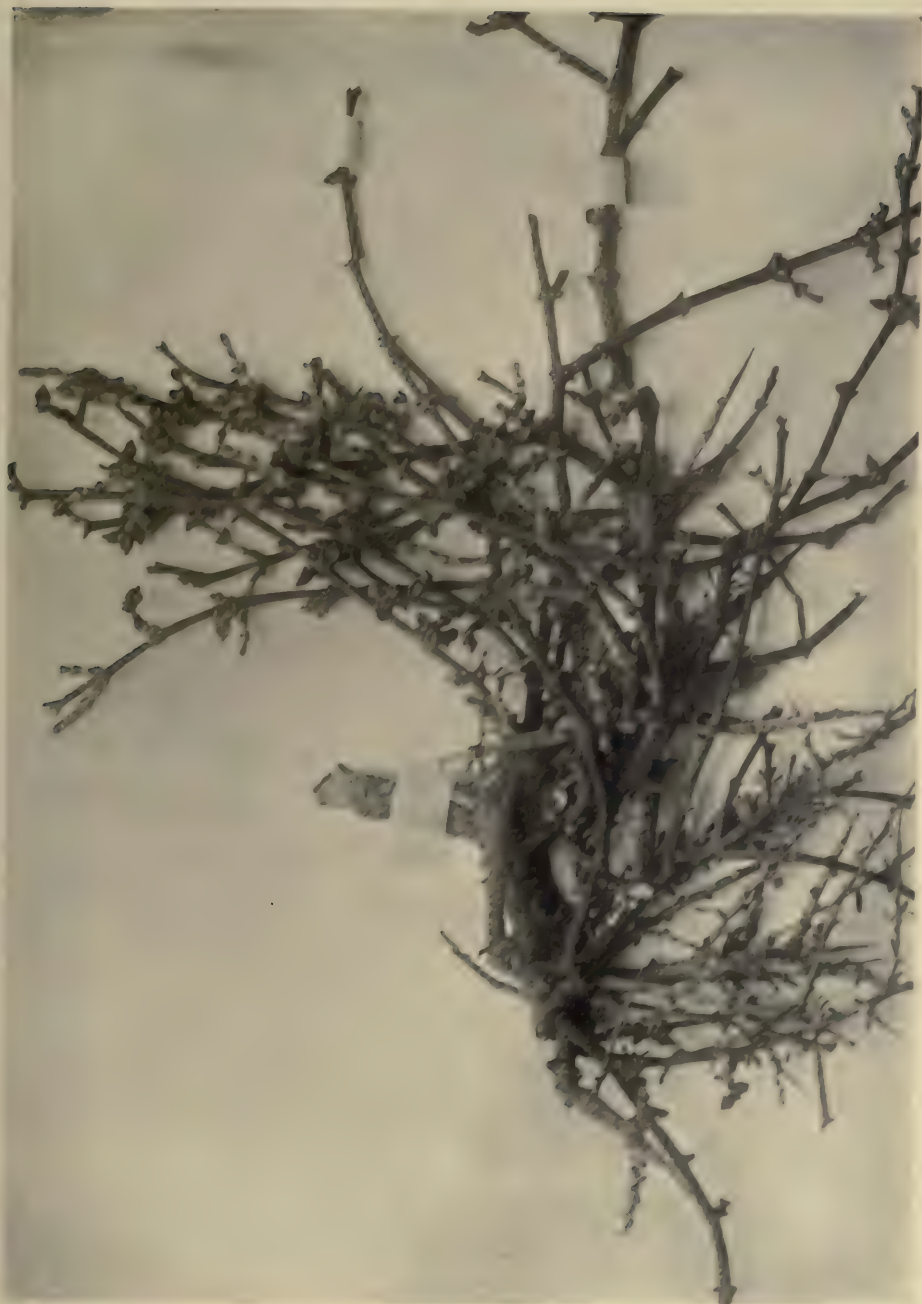
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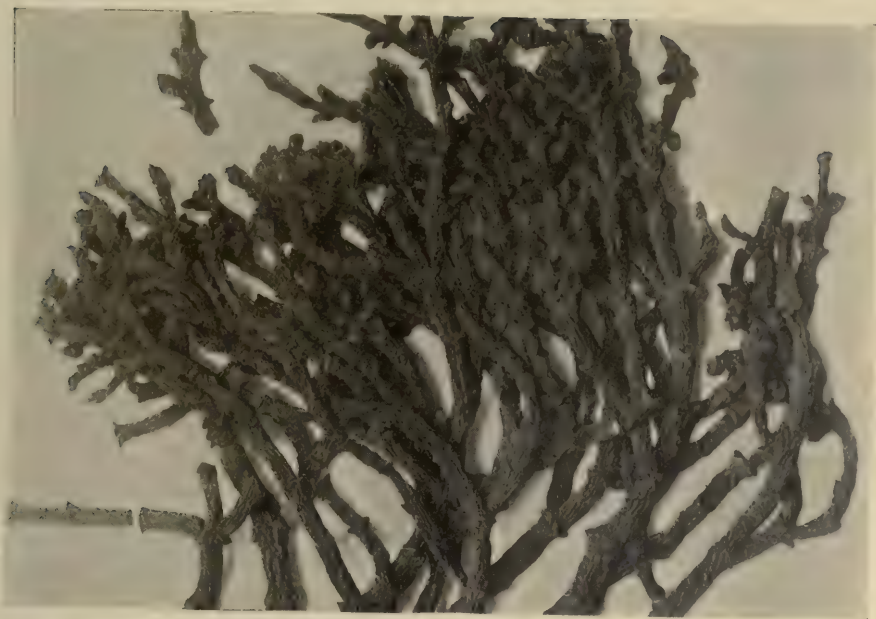
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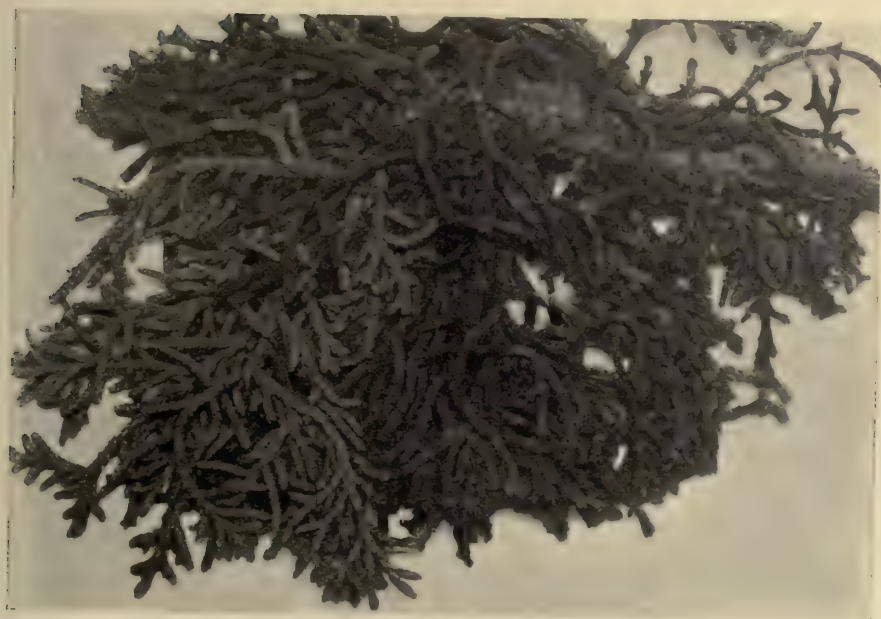
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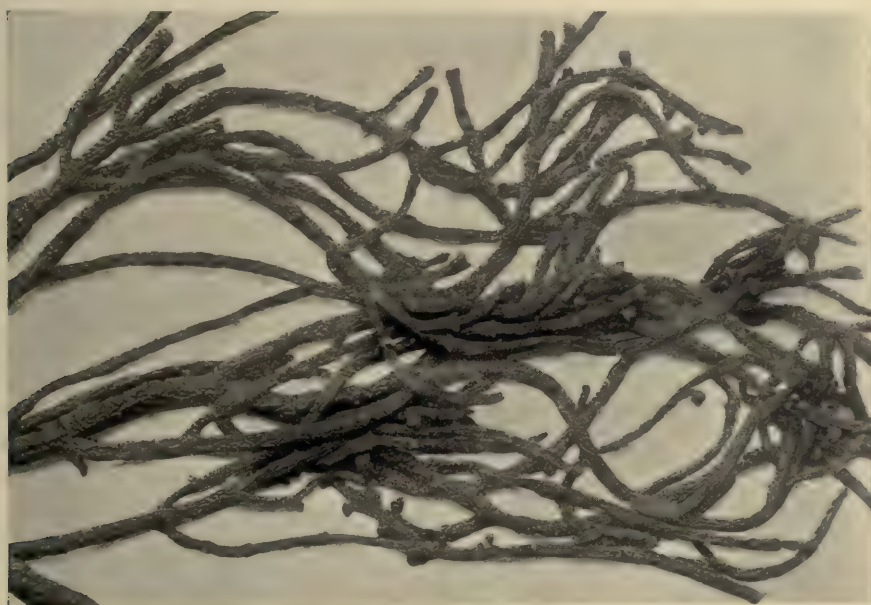
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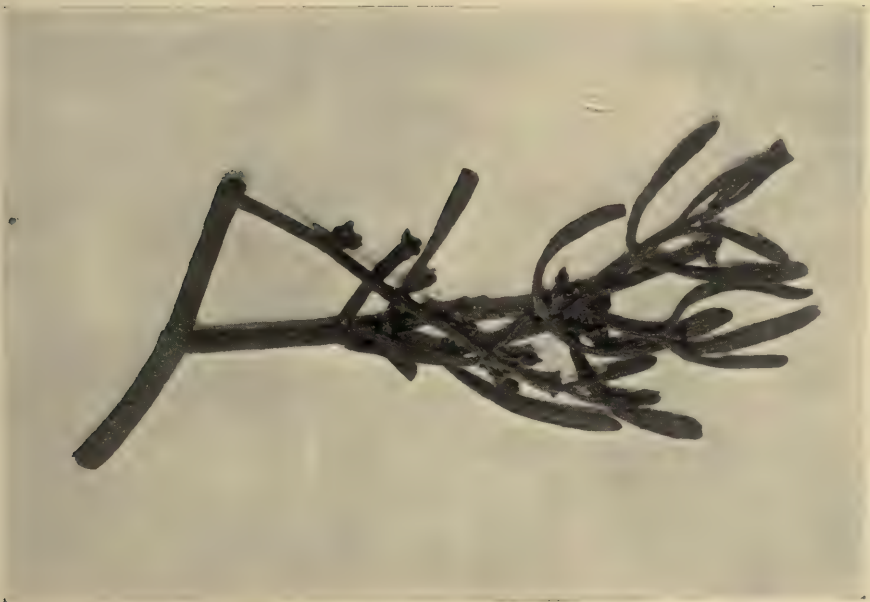
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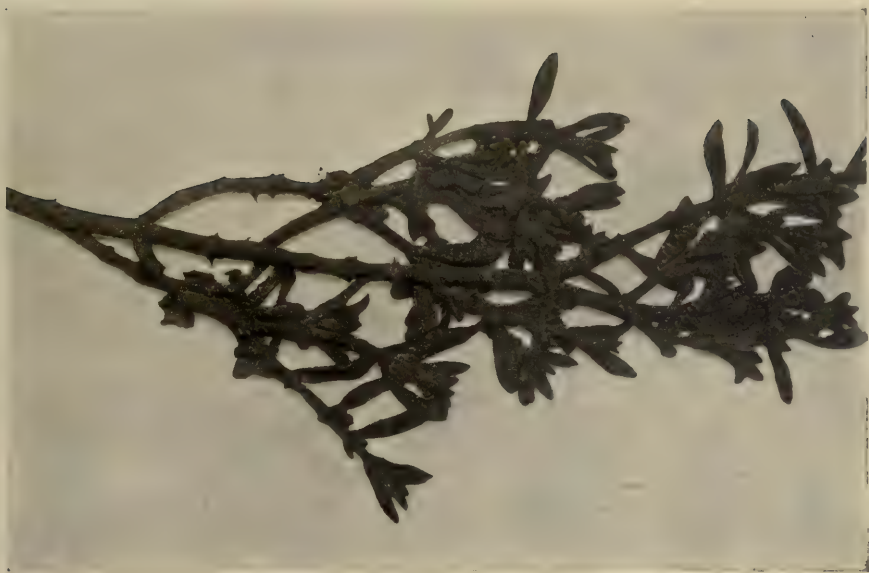
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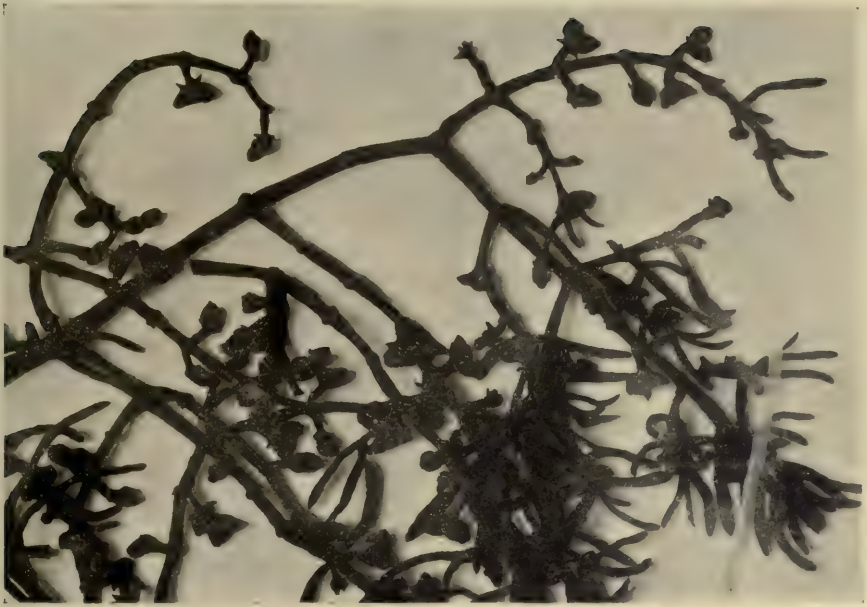
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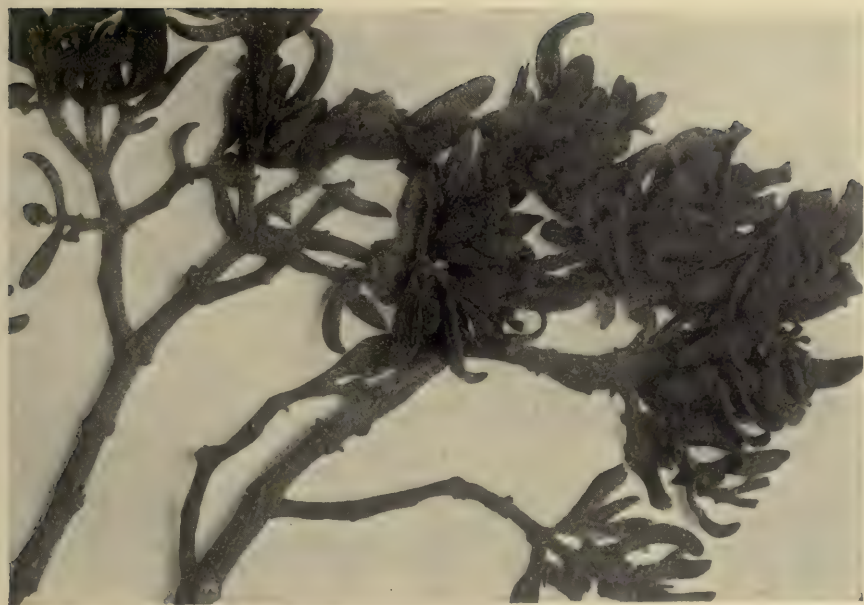


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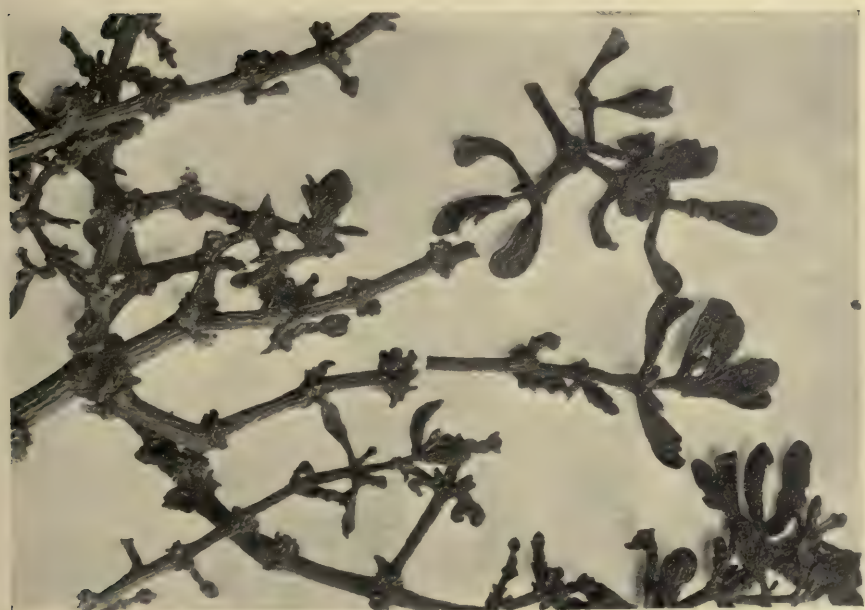
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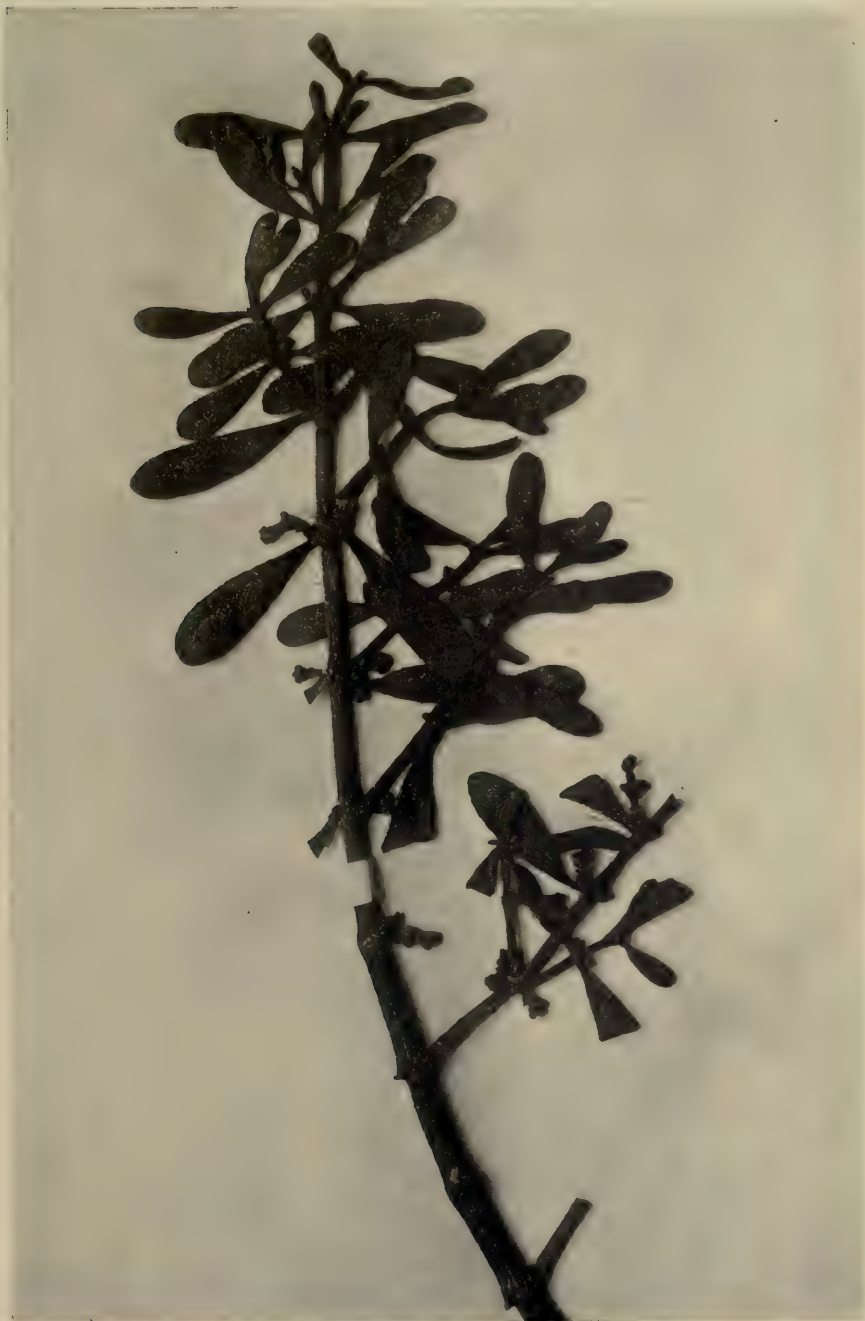
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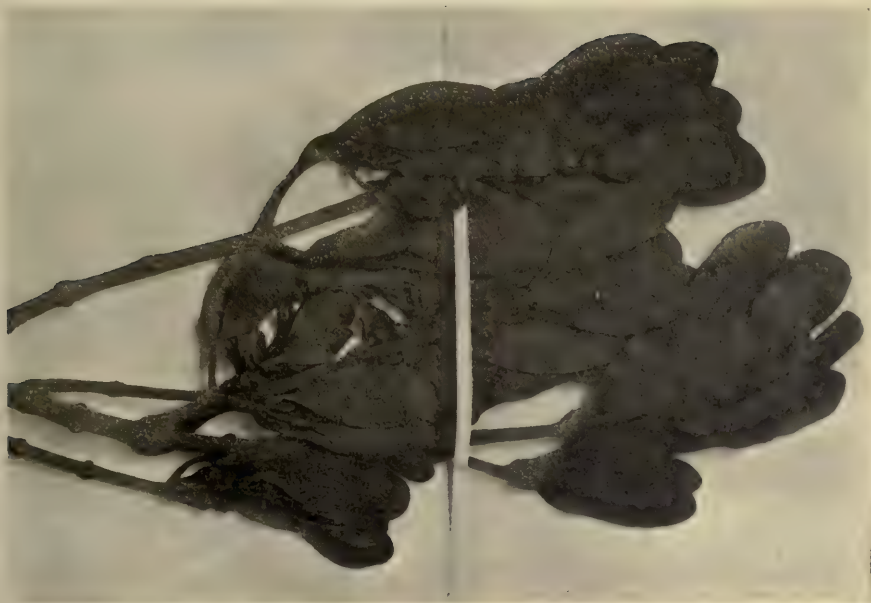
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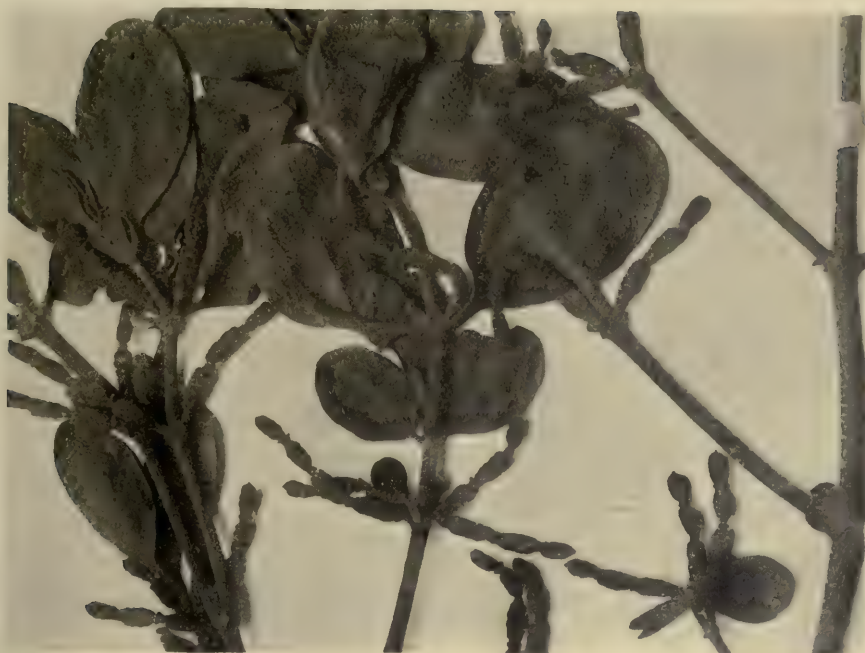
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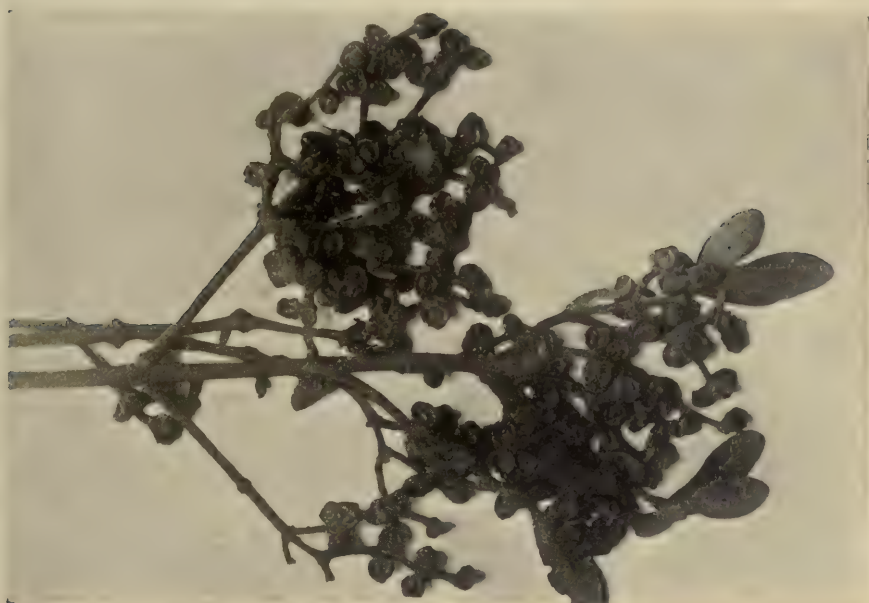
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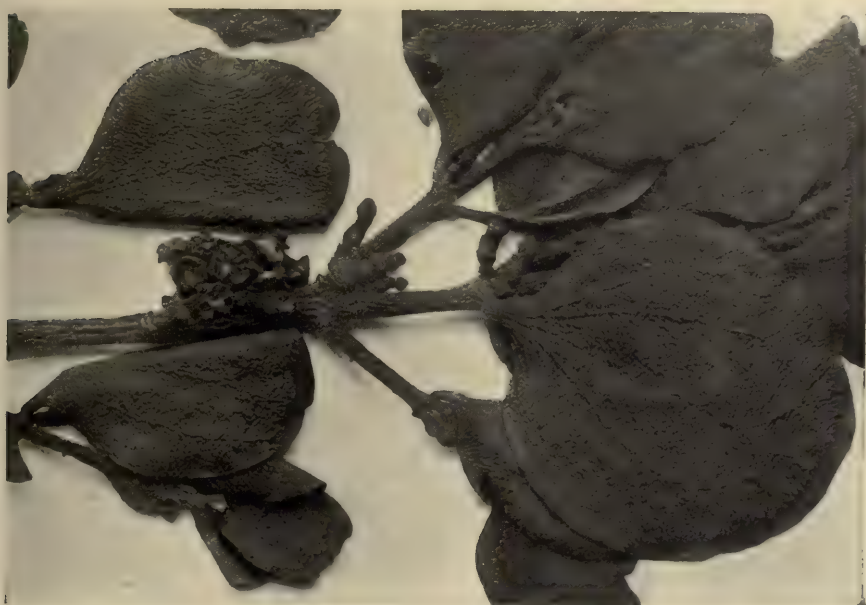
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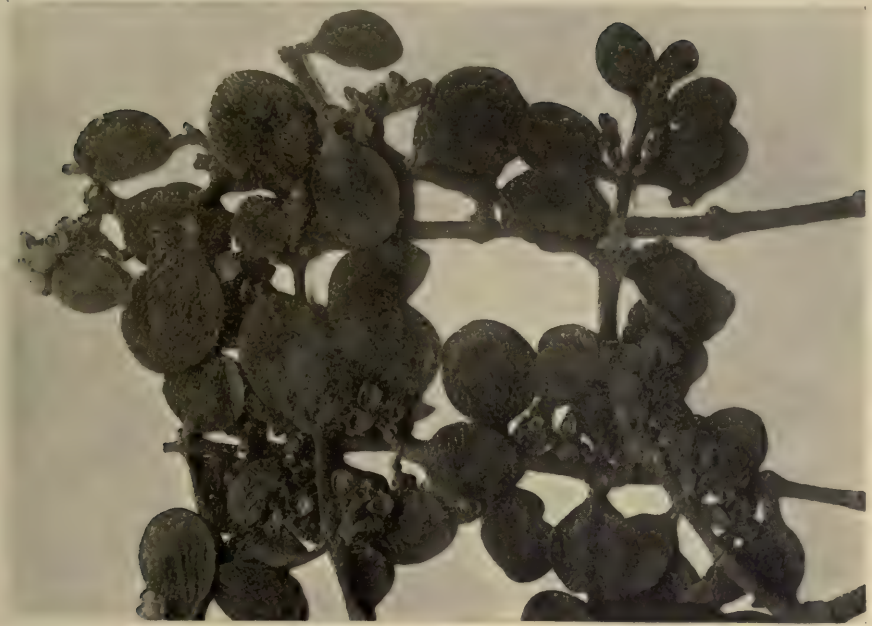
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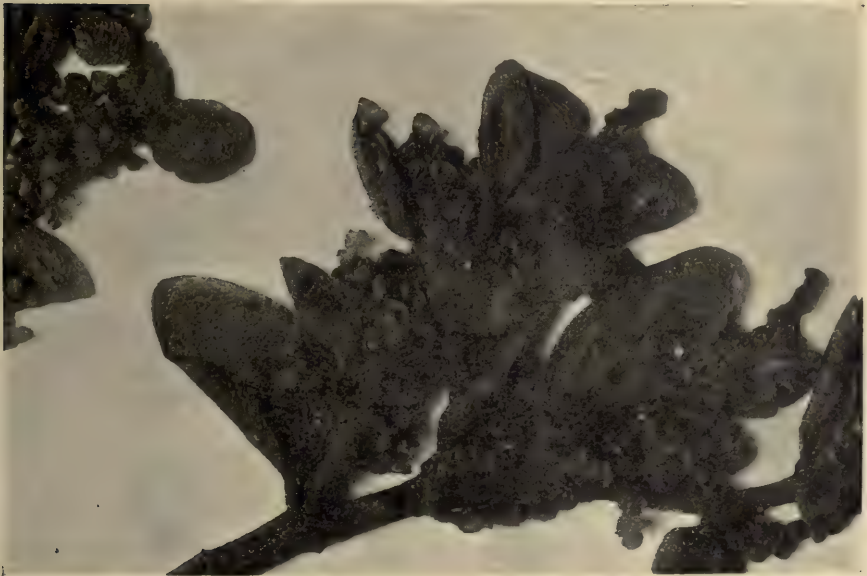
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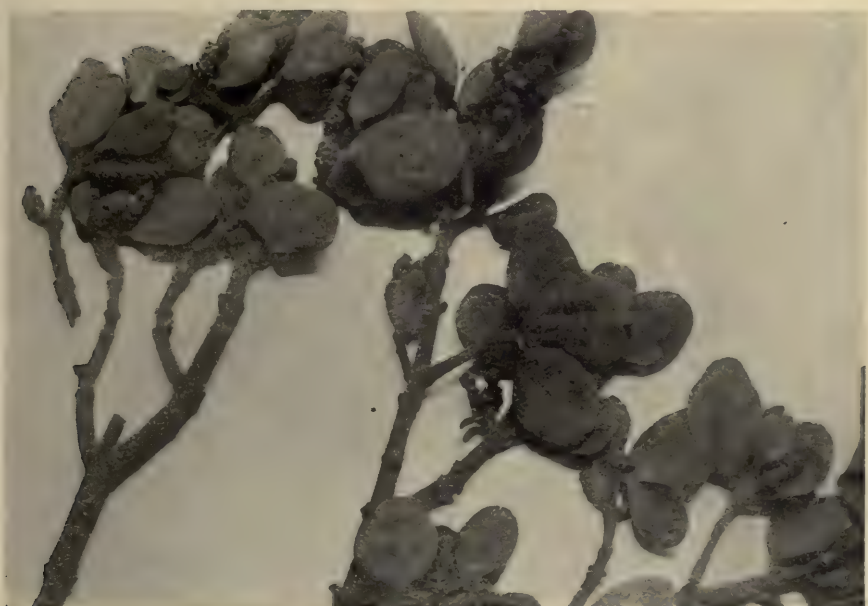
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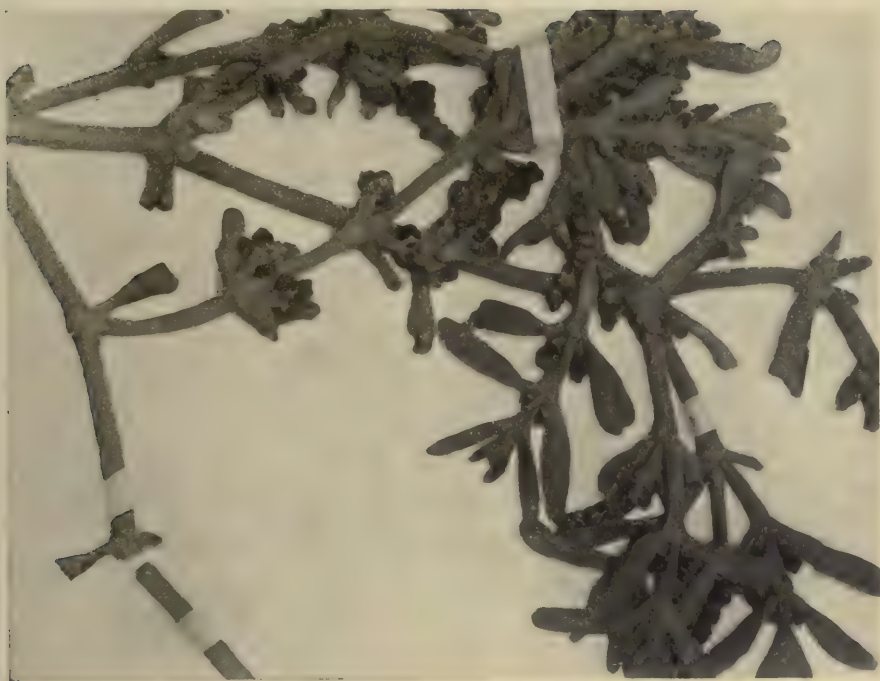
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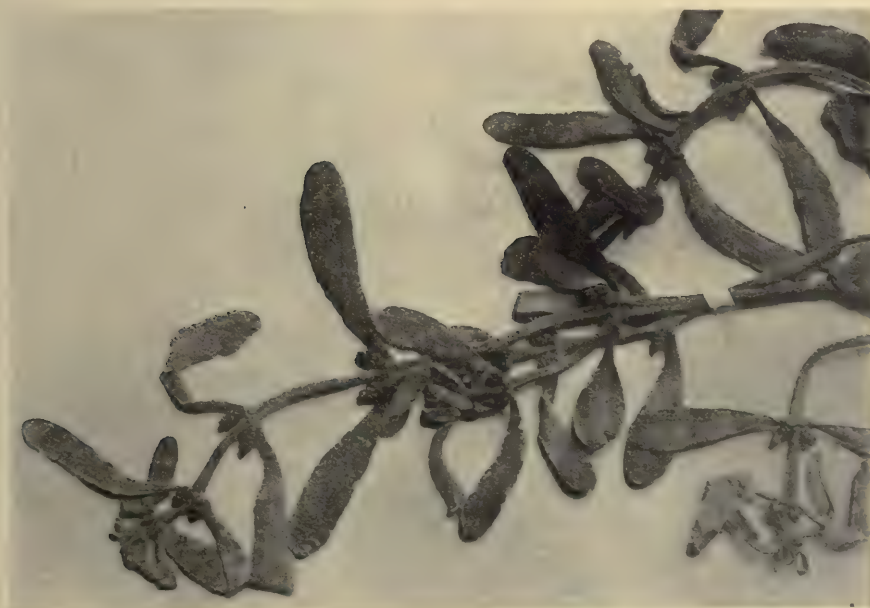
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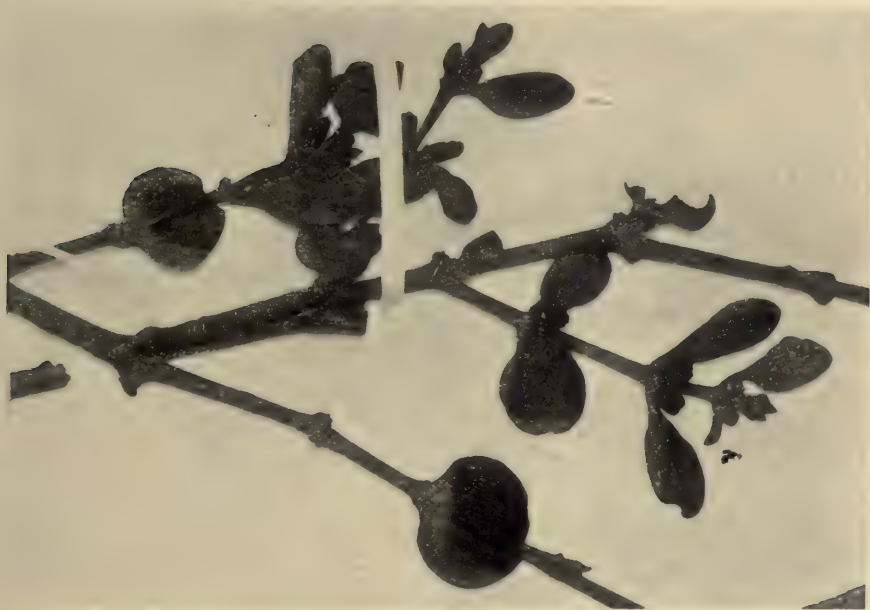
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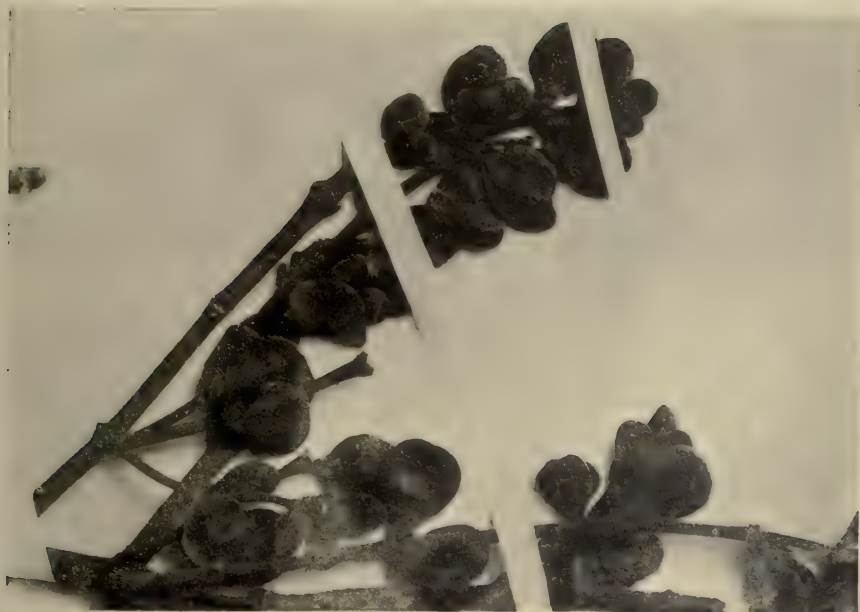
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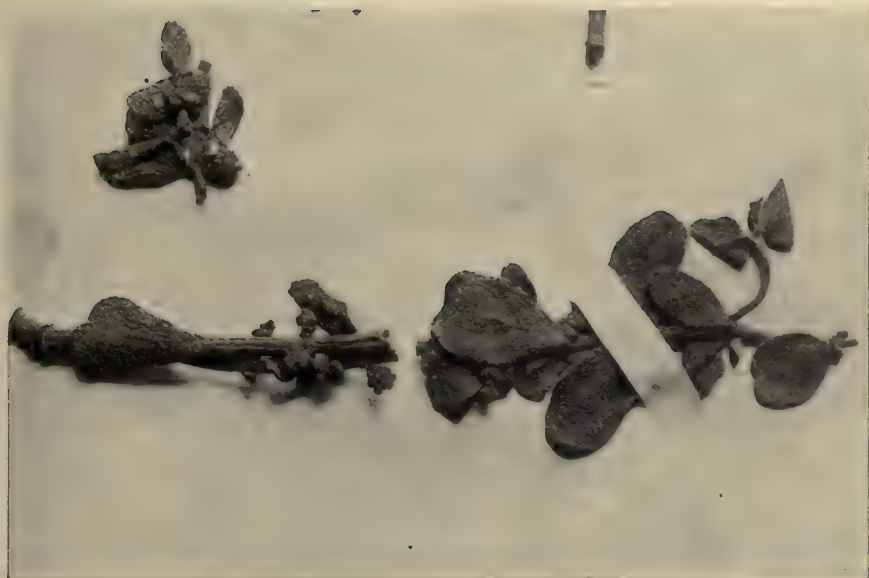
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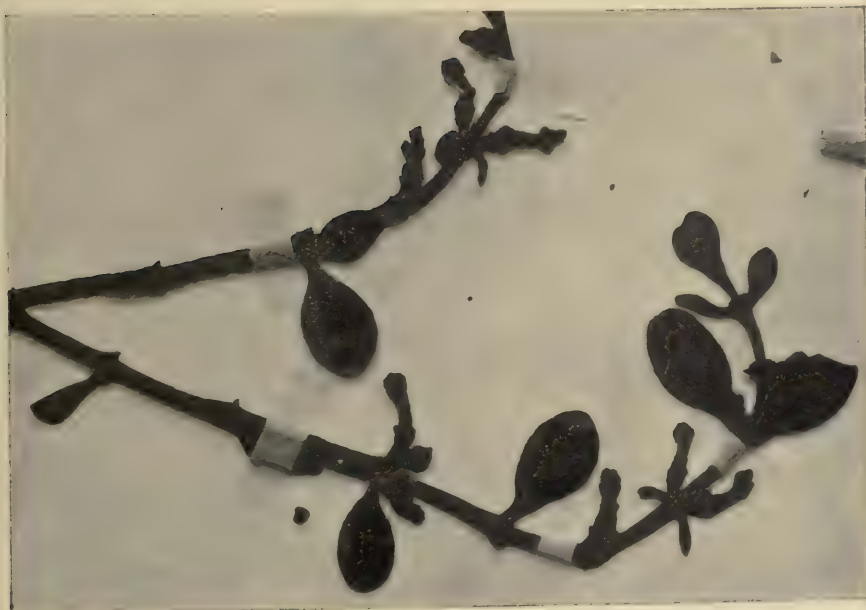
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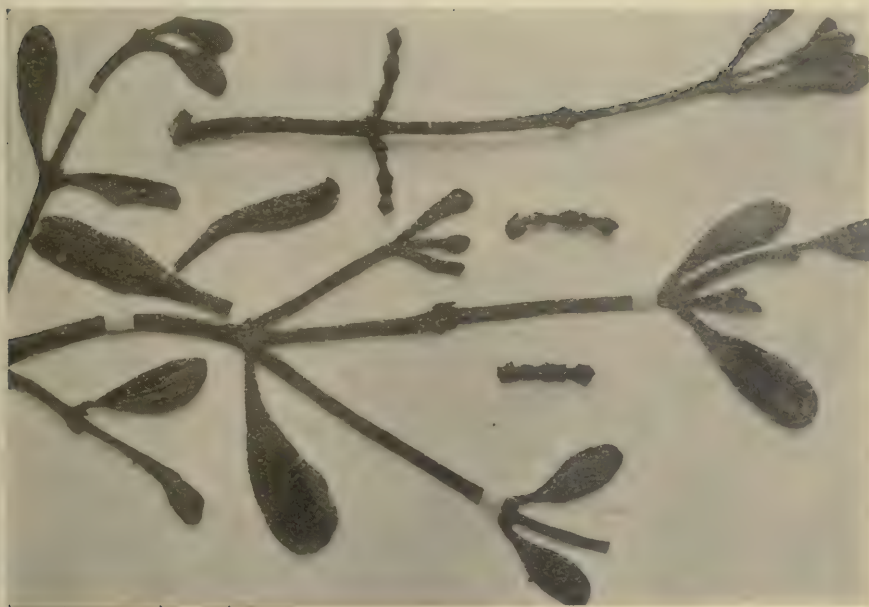
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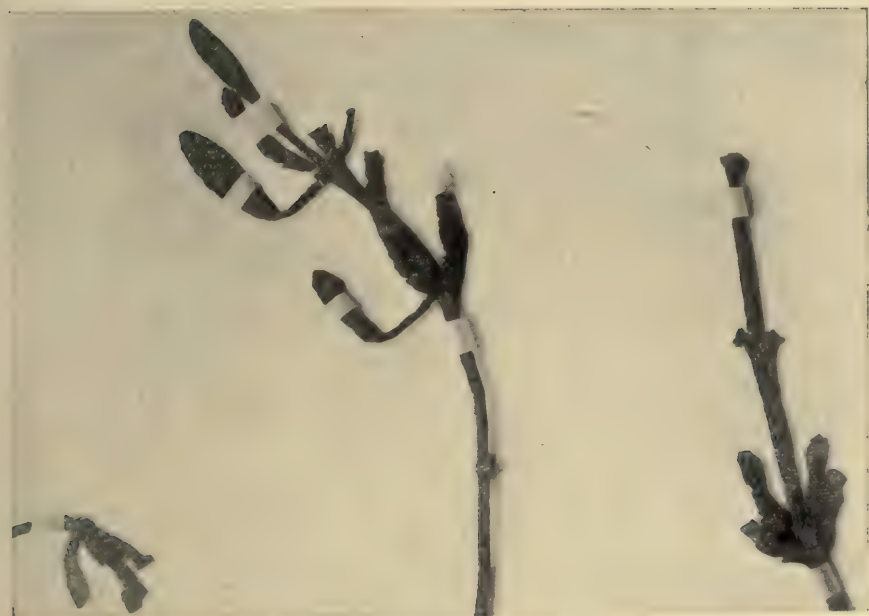
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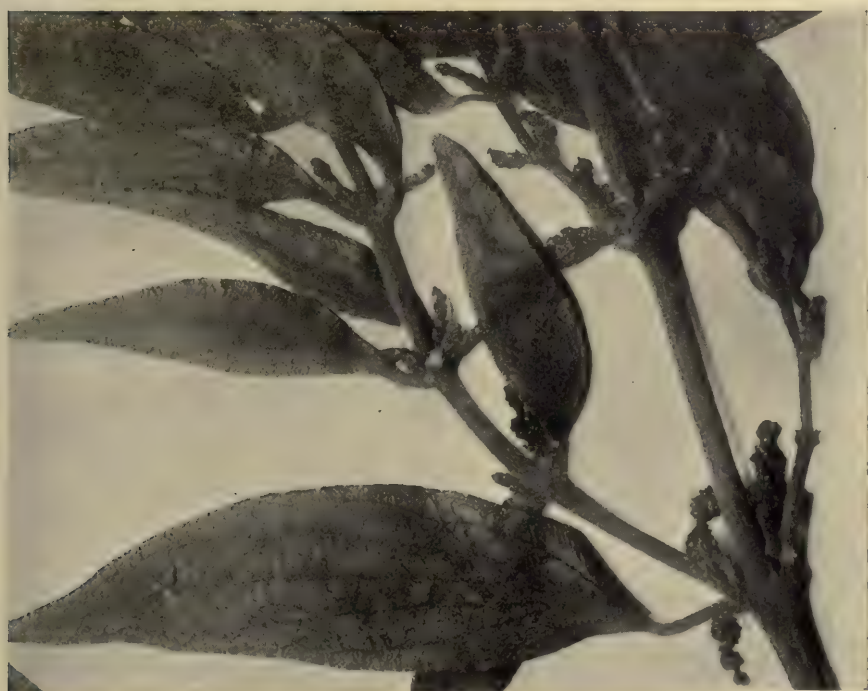
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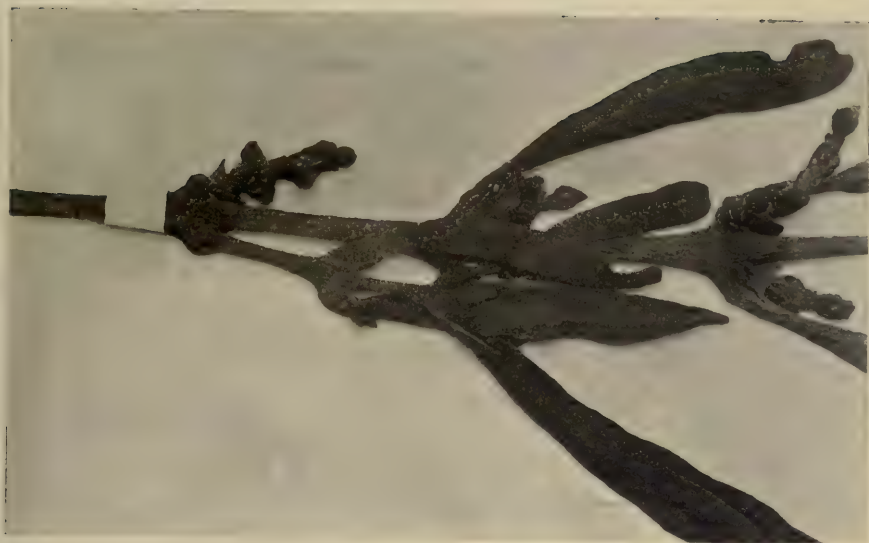
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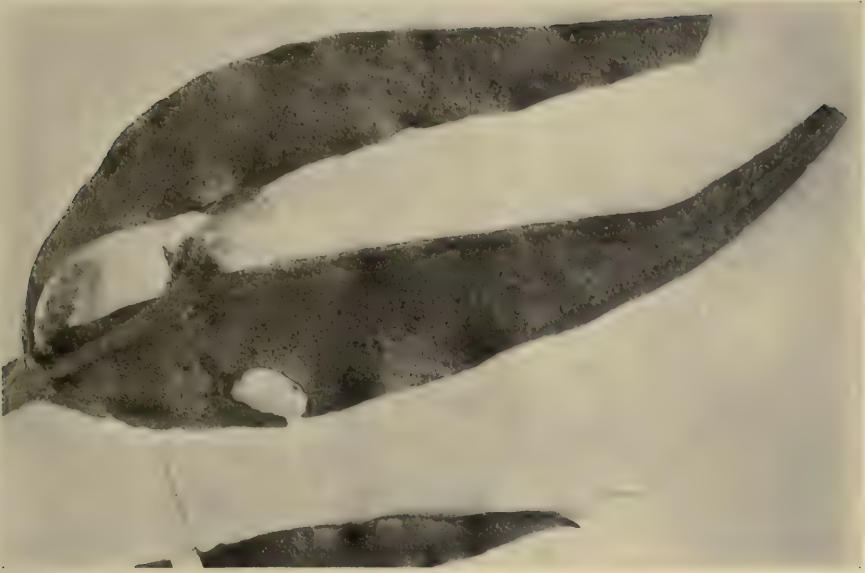
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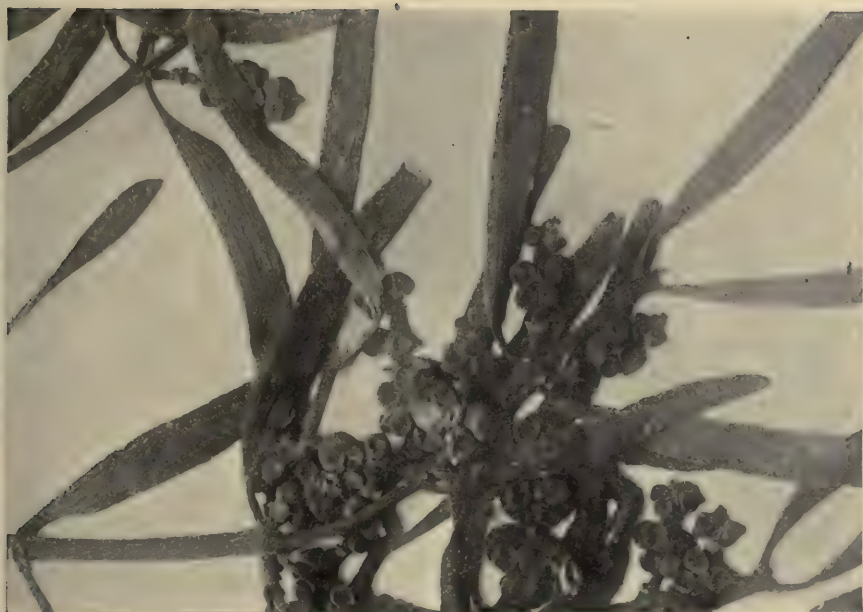
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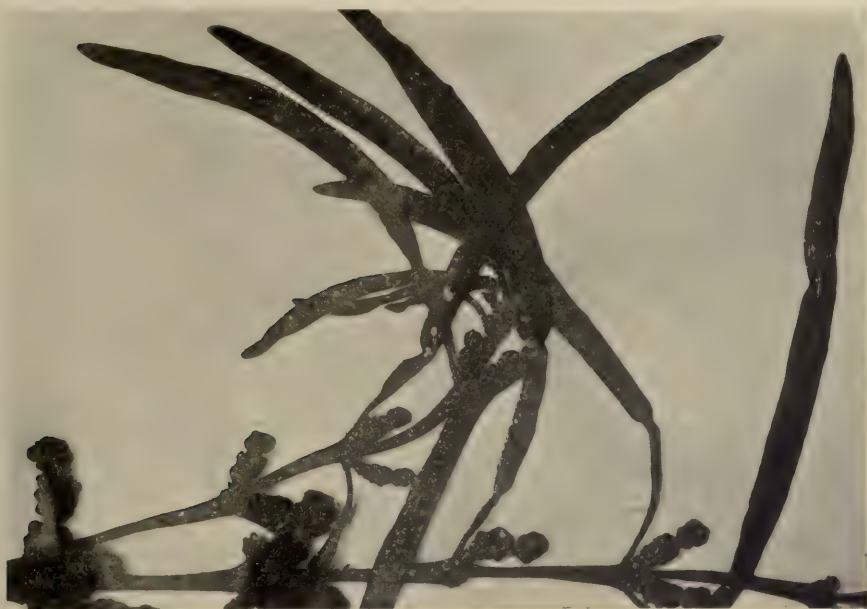
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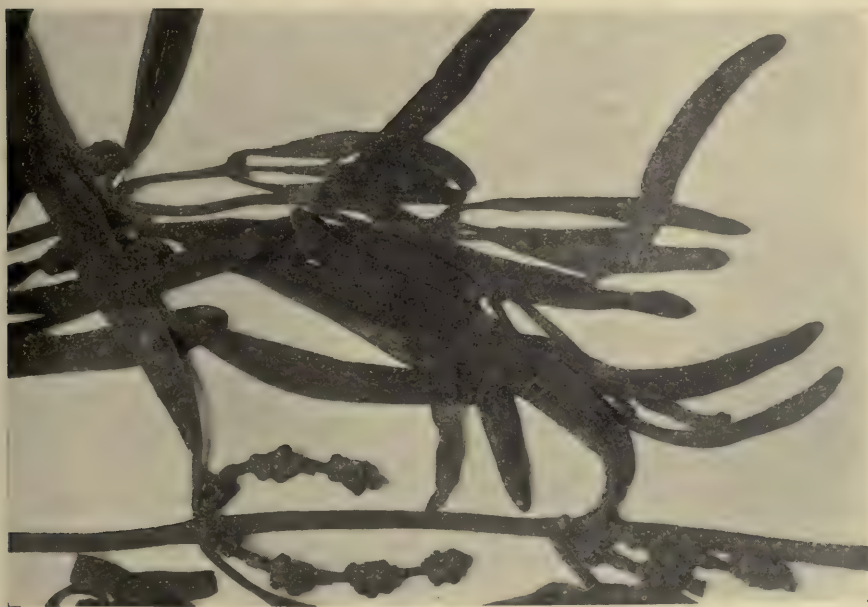
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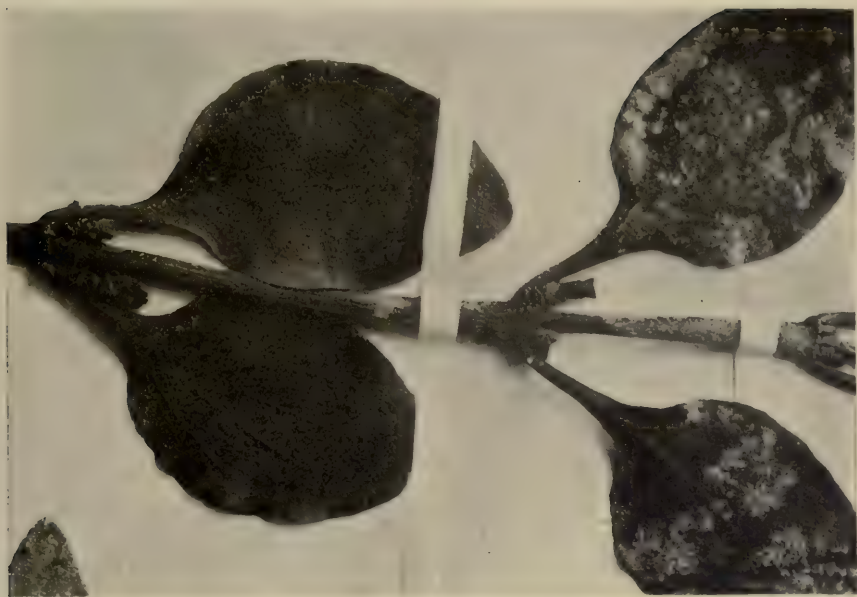
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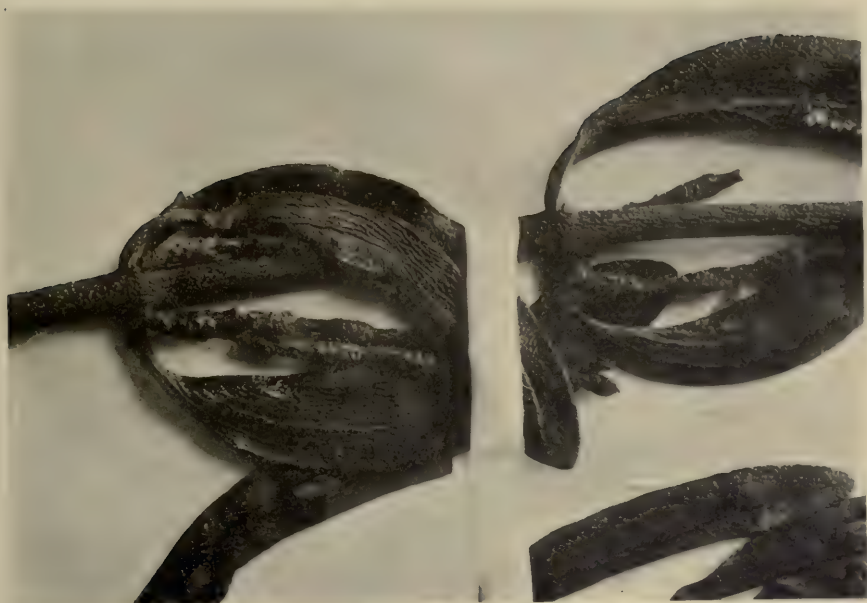
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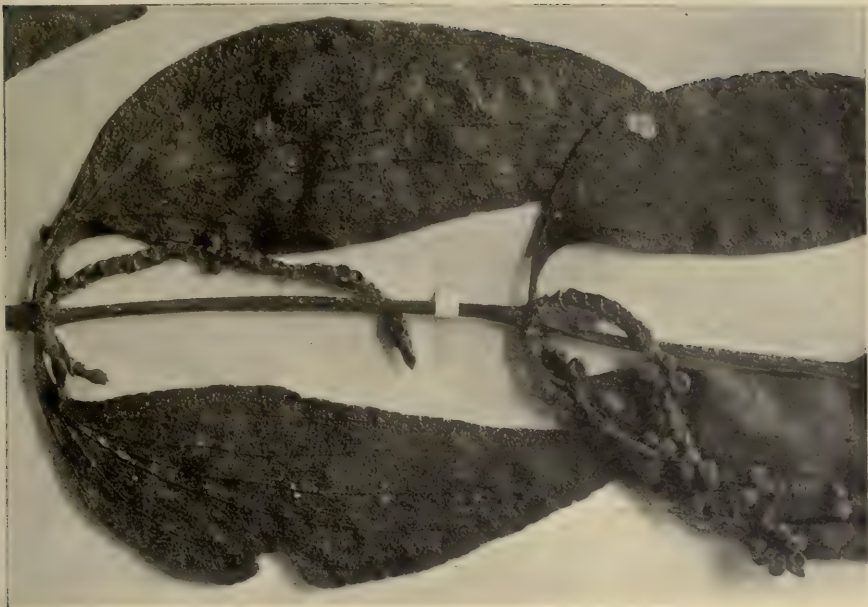
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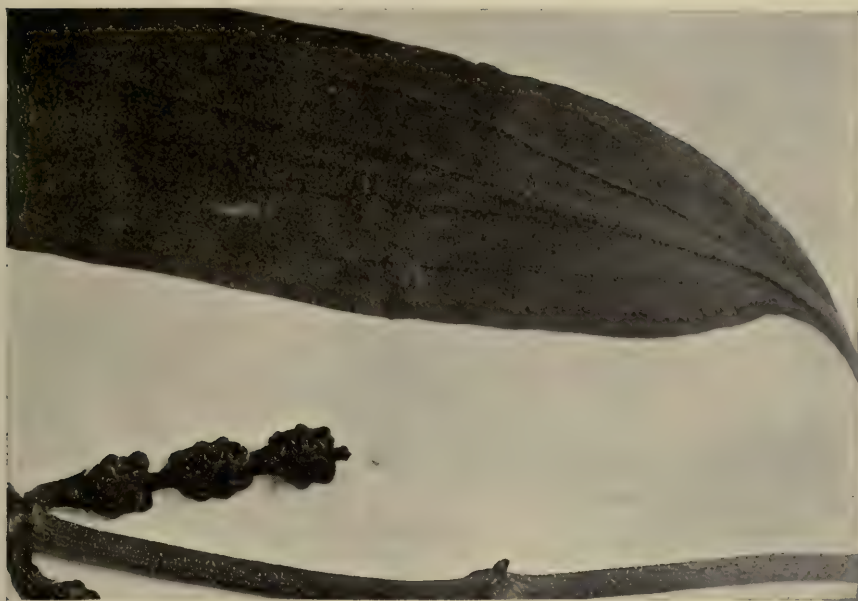
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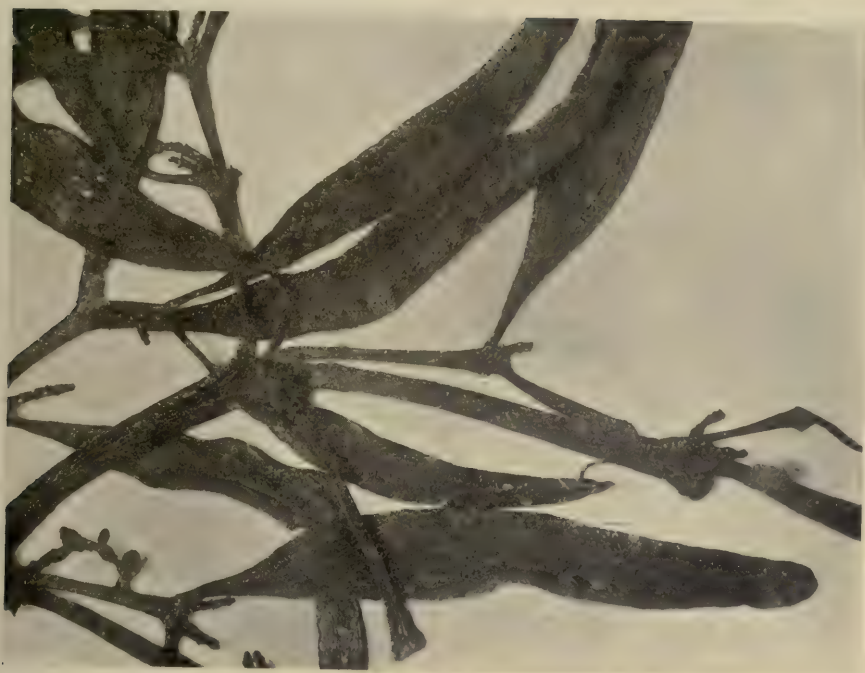
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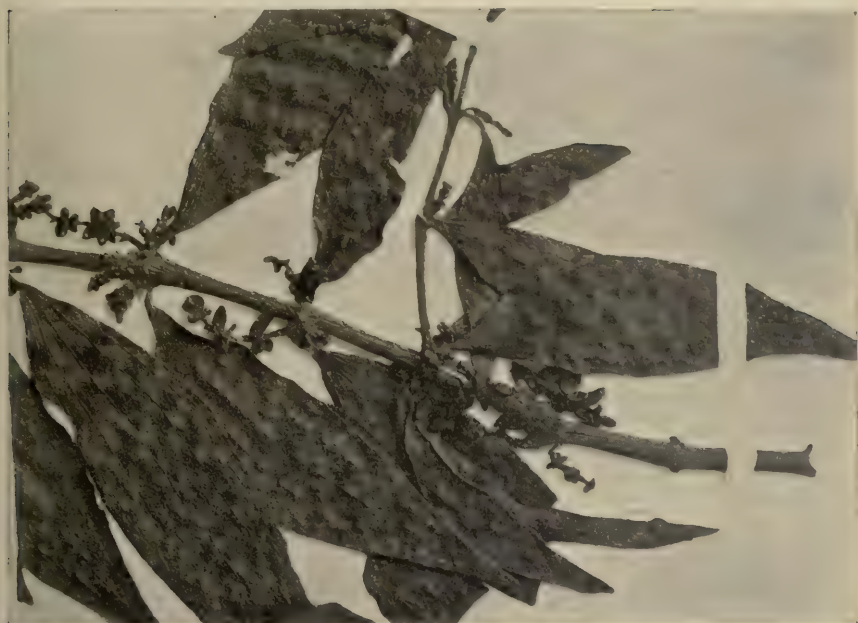
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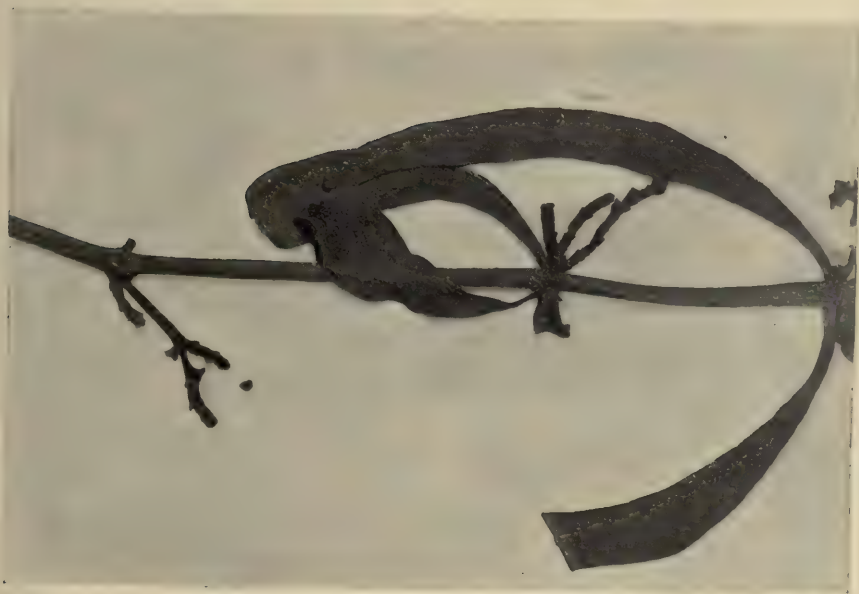
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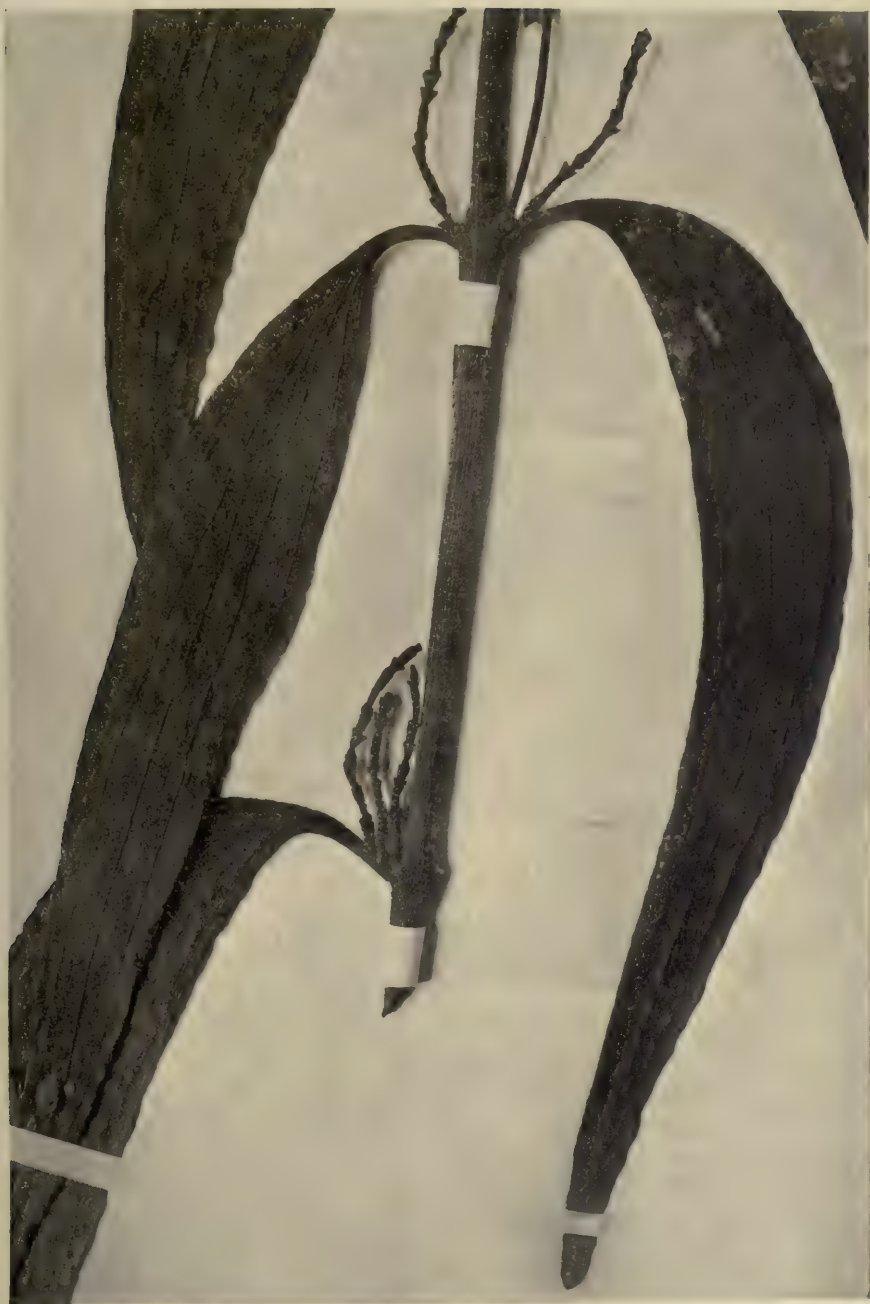
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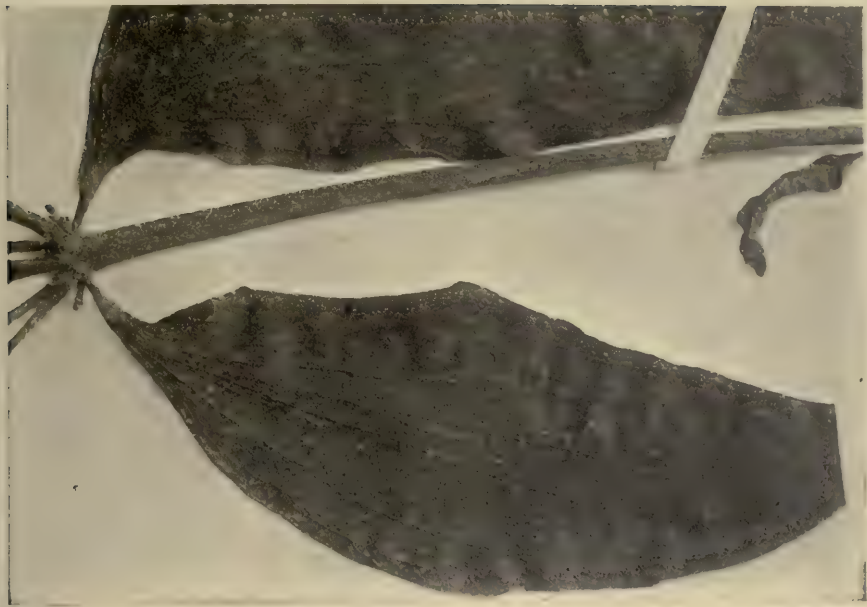
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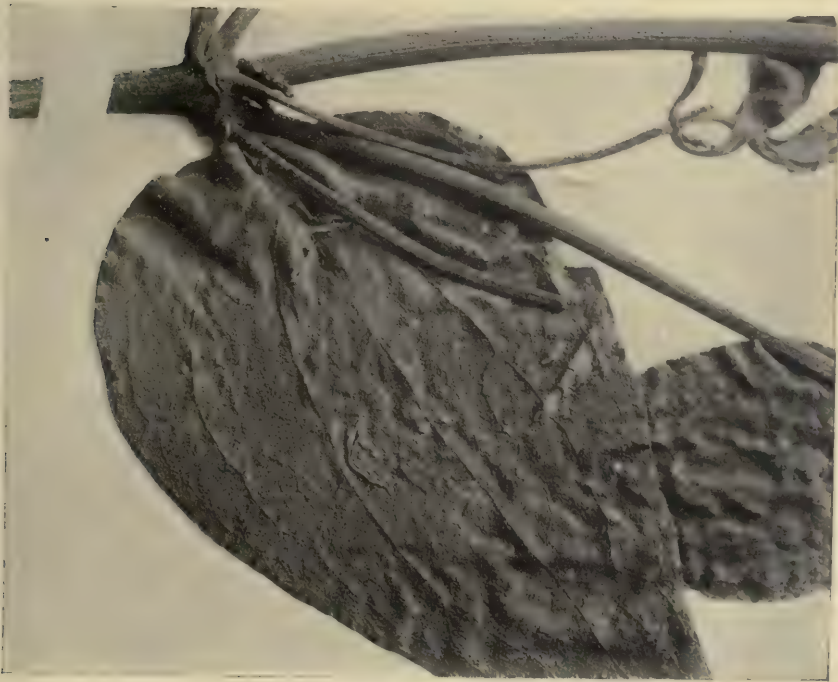
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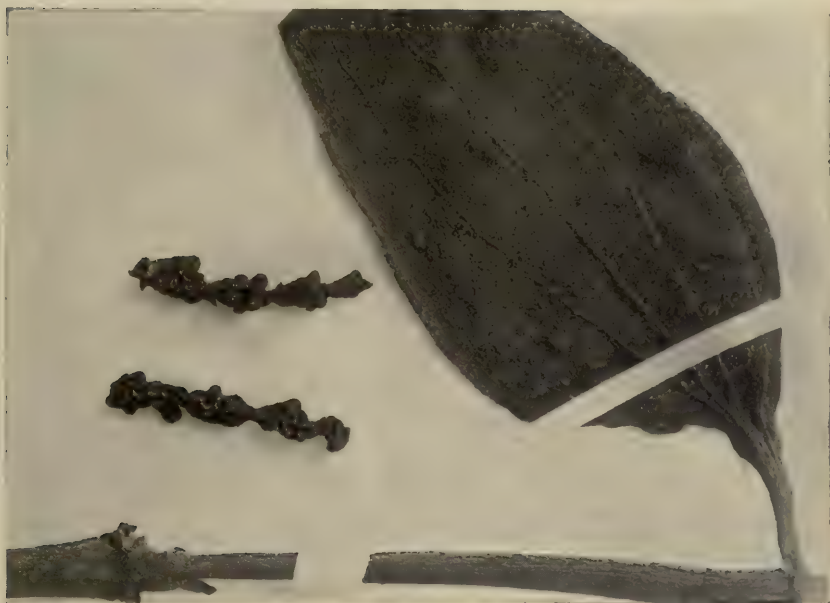
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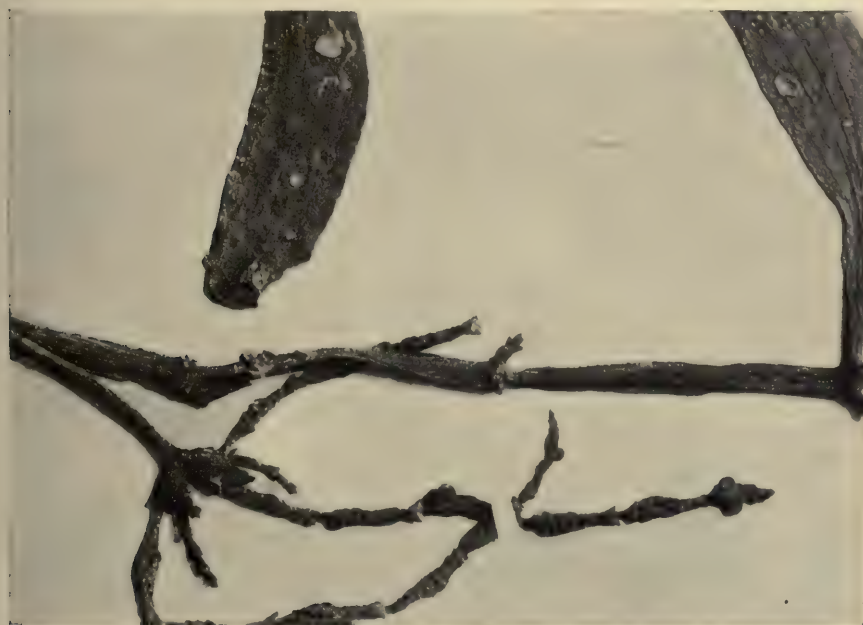
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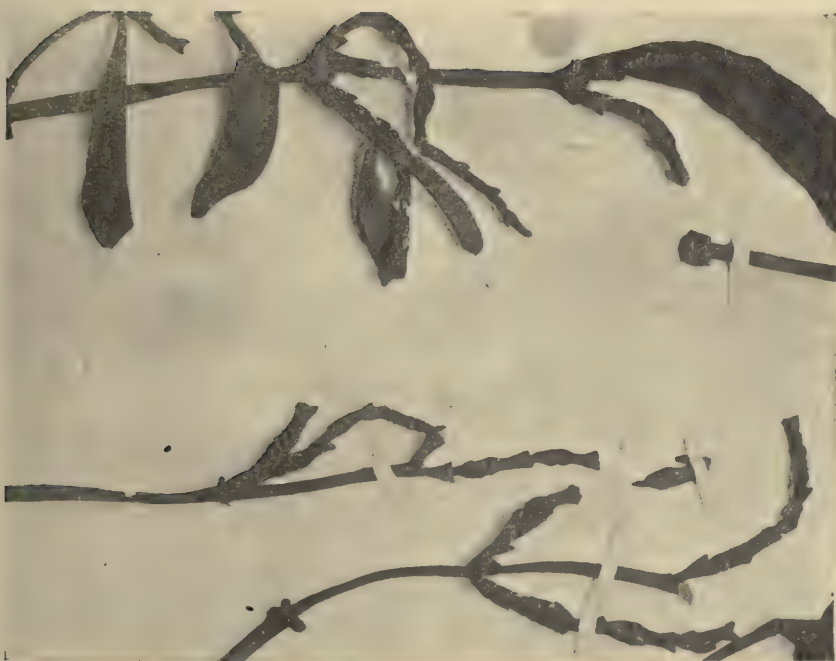
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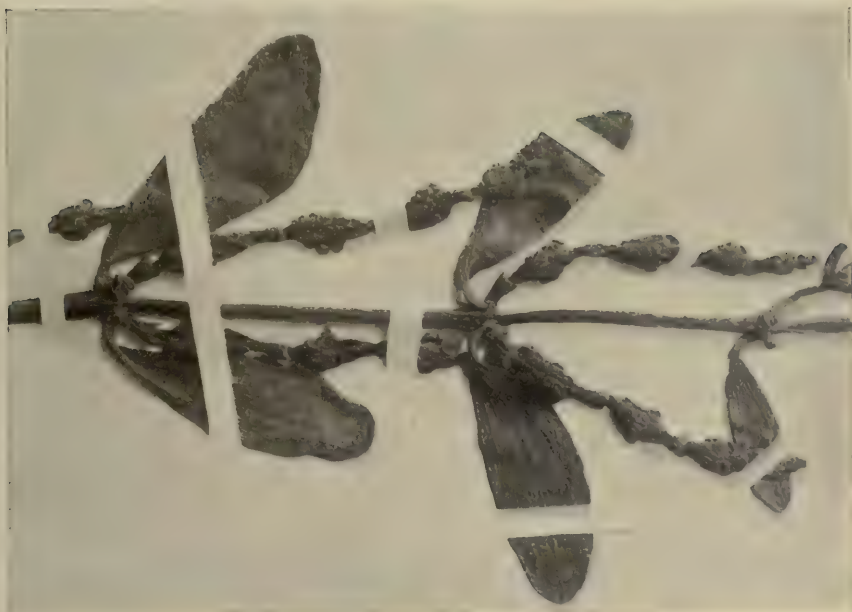
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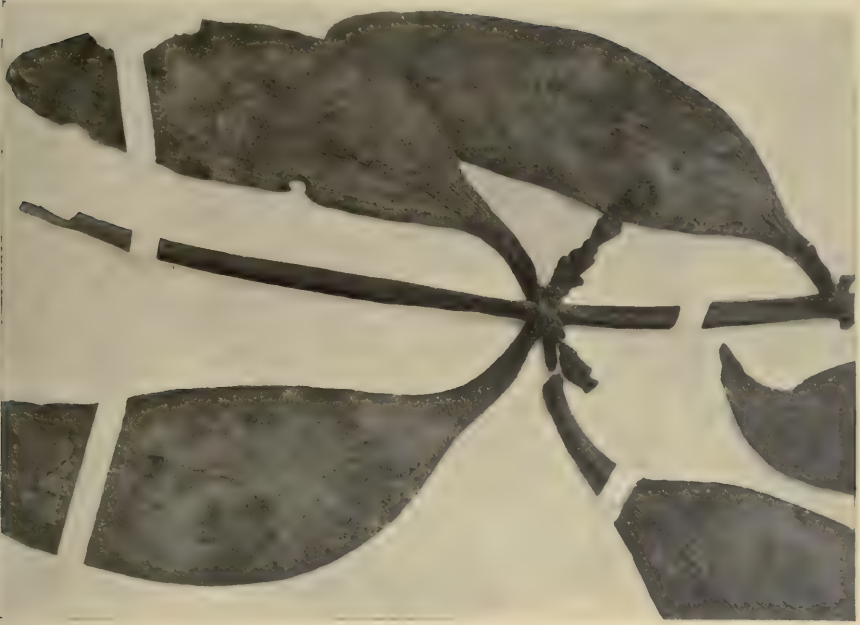
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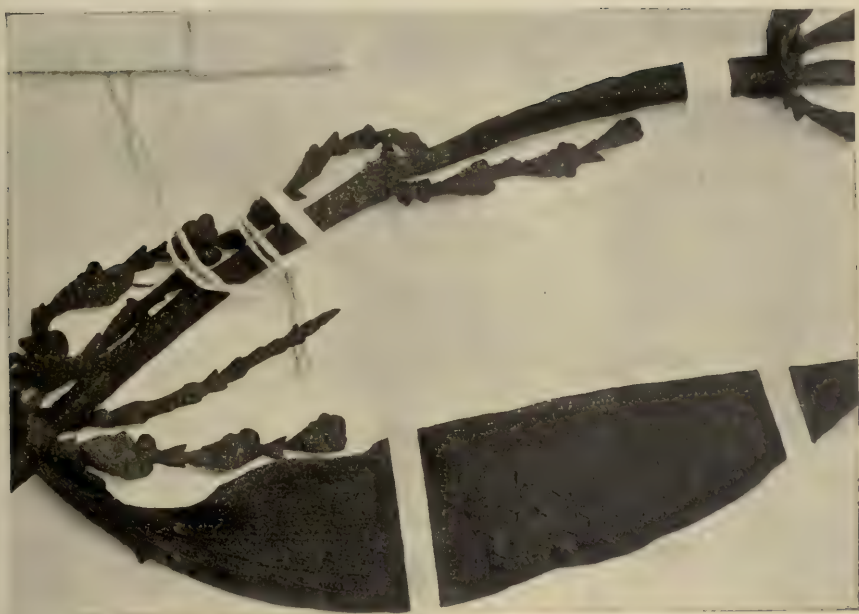
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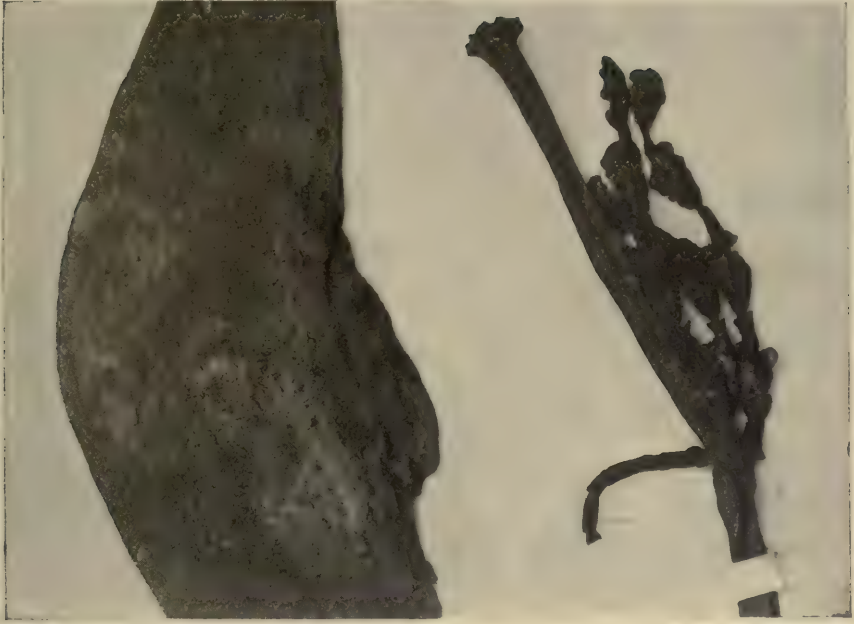
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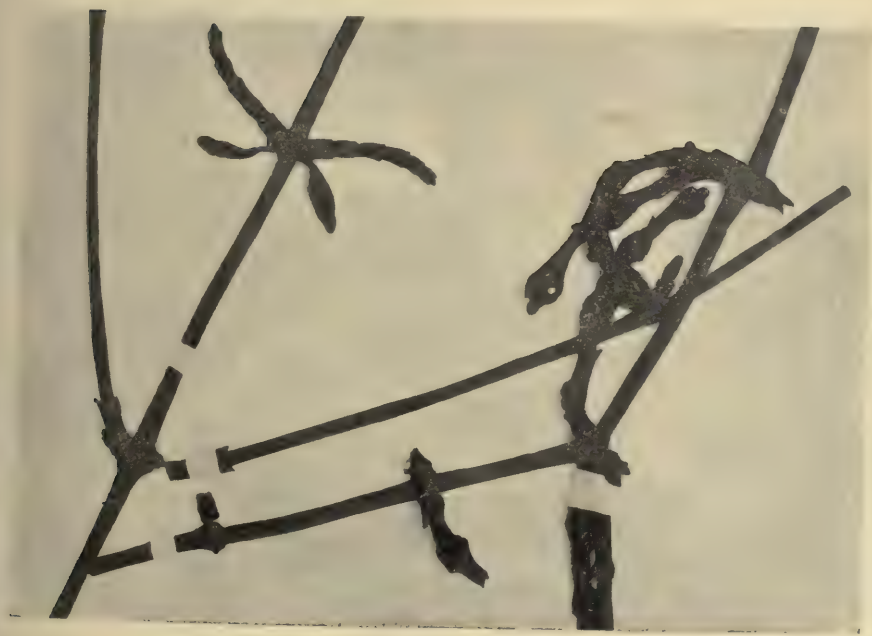
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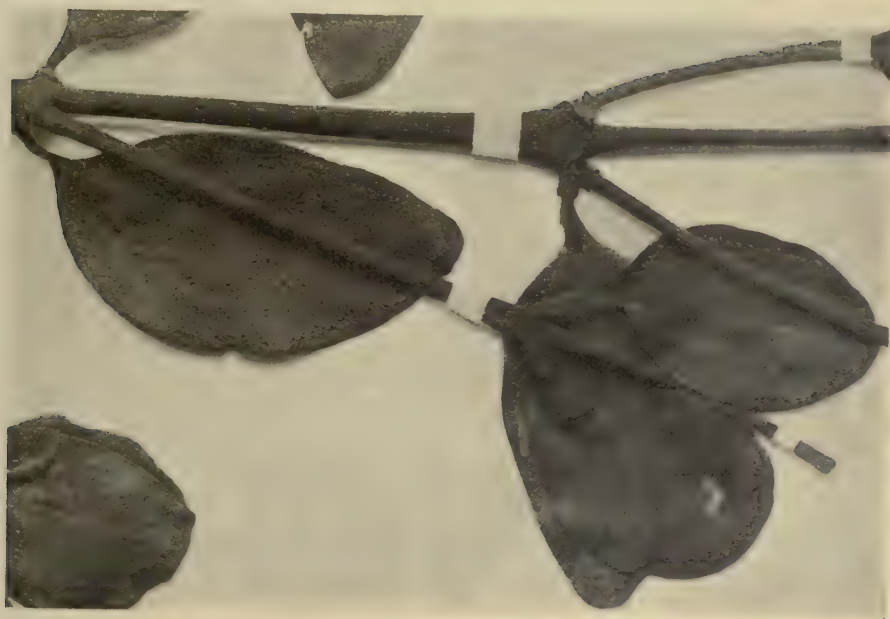
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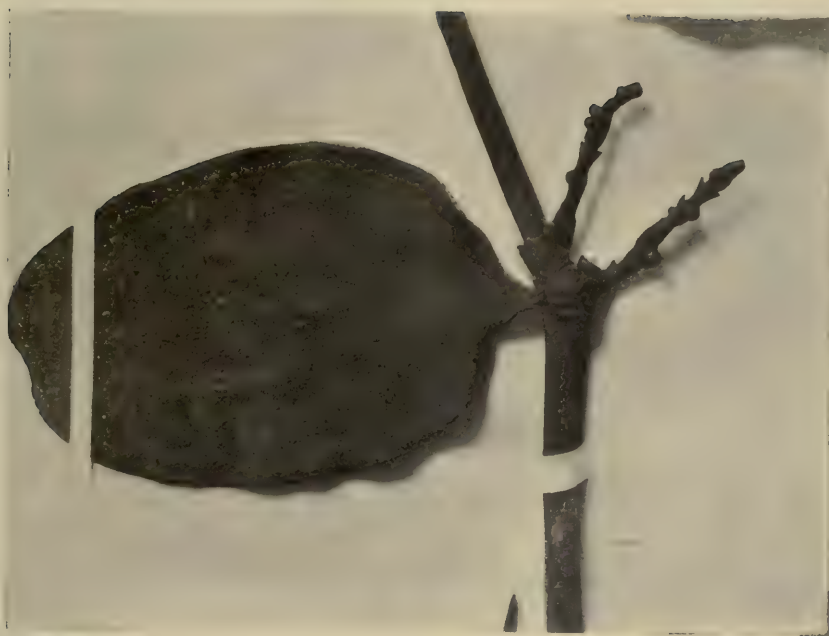
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PHORADENDRON ROBUSTISSIMUM SIMULANS



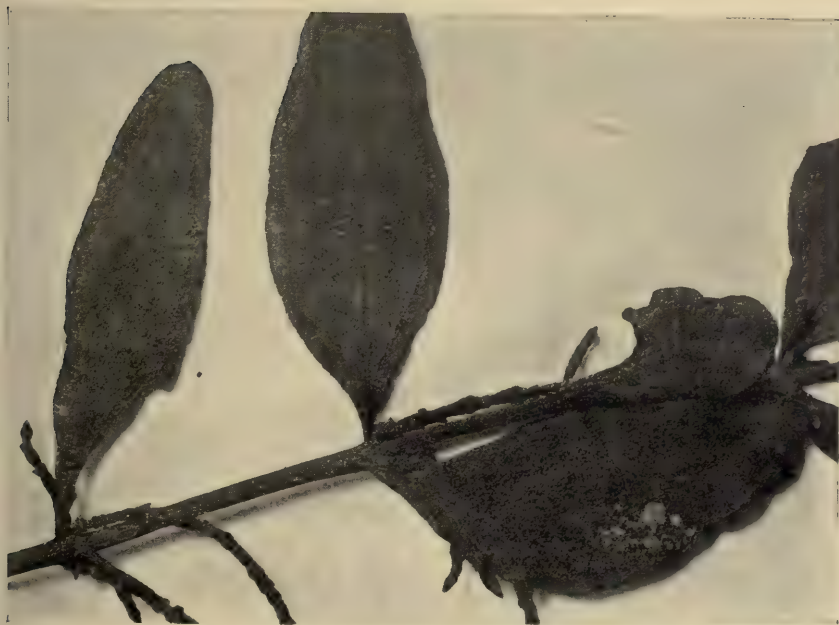
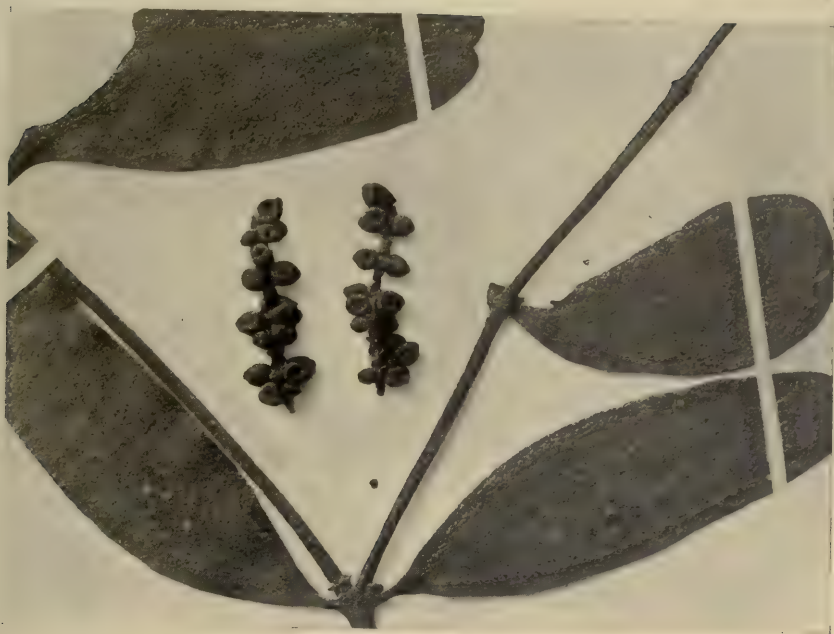
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PHORADENDRON CONGESTUM



PHORADENDRON CARIPENSE



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PHORADENDRON EXIGUUM



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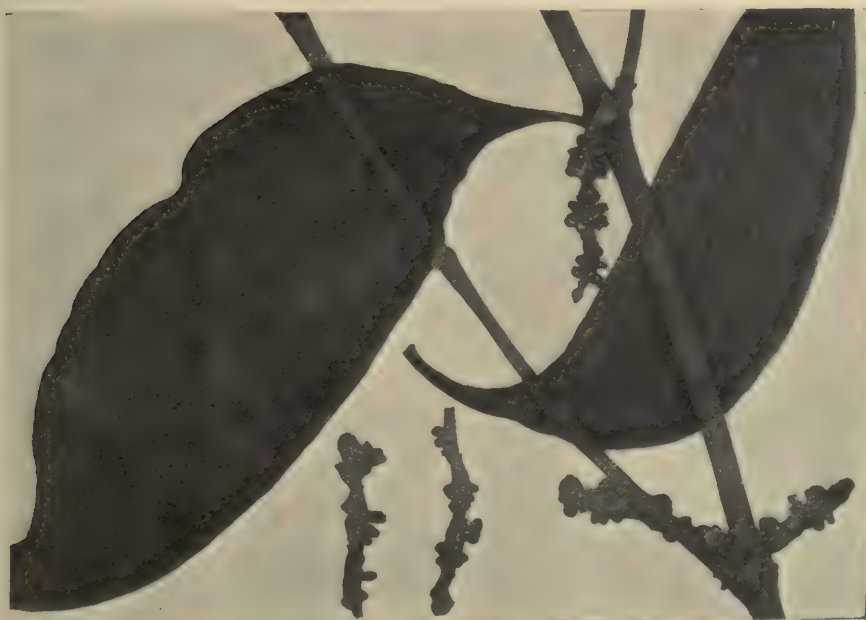
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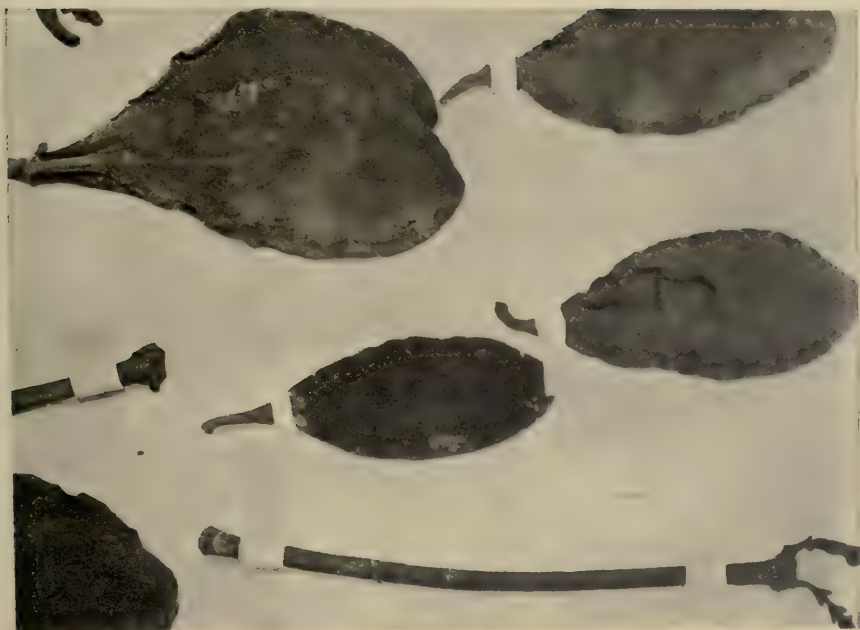
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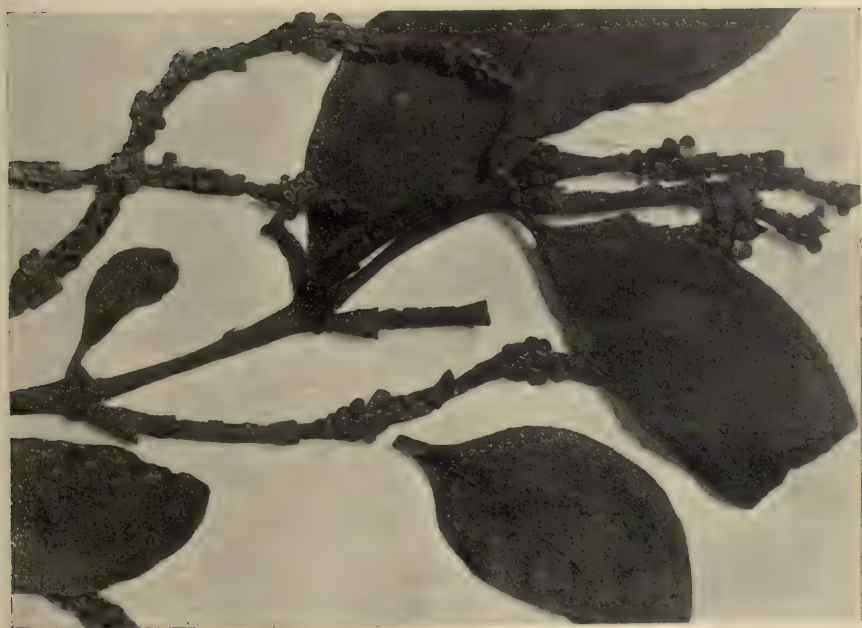
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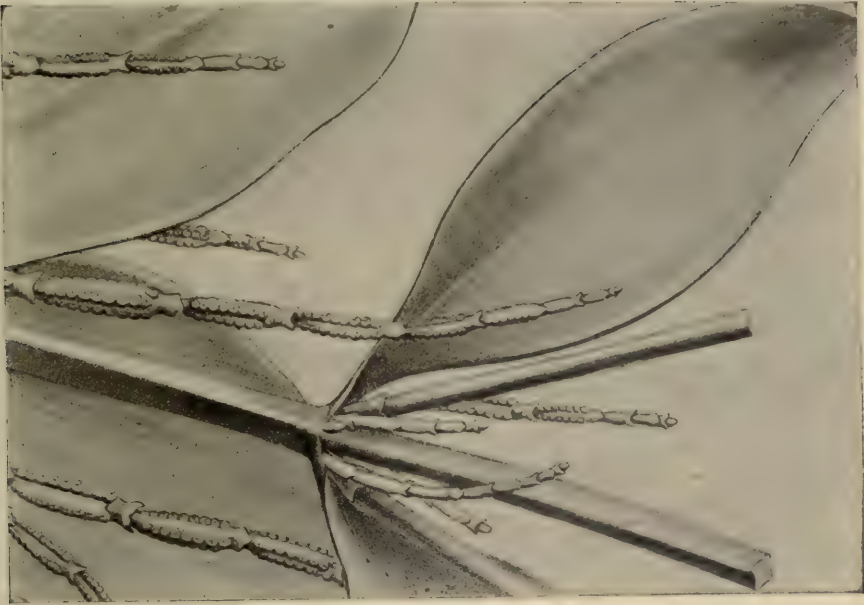
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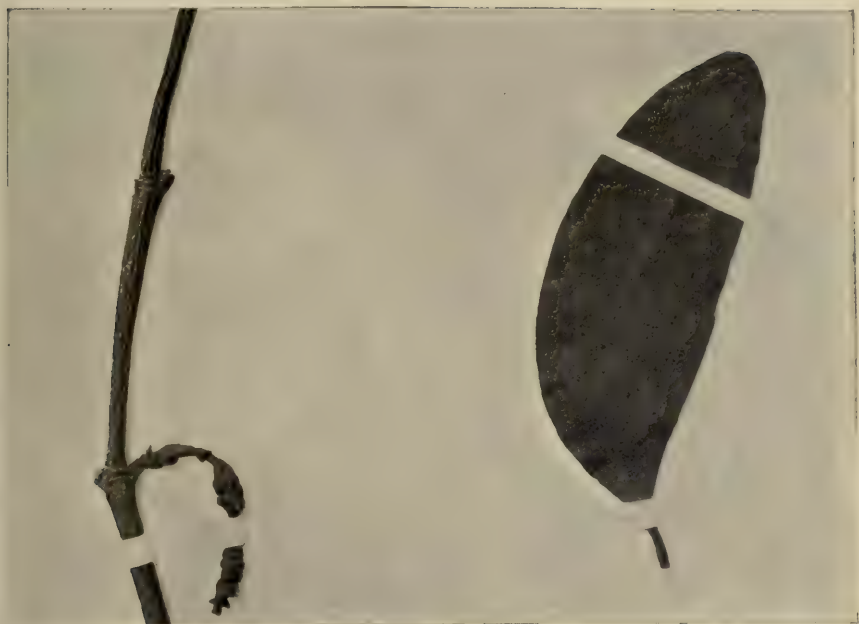
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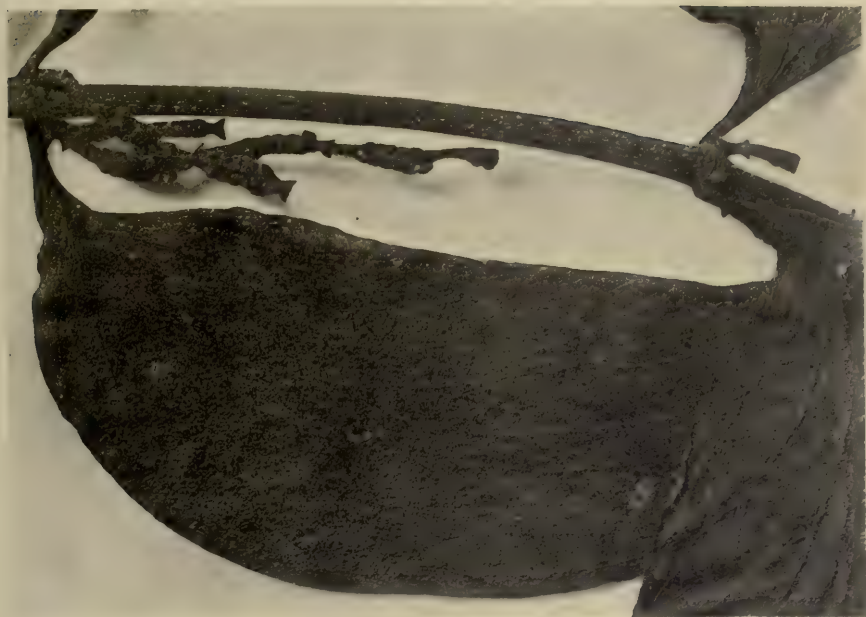
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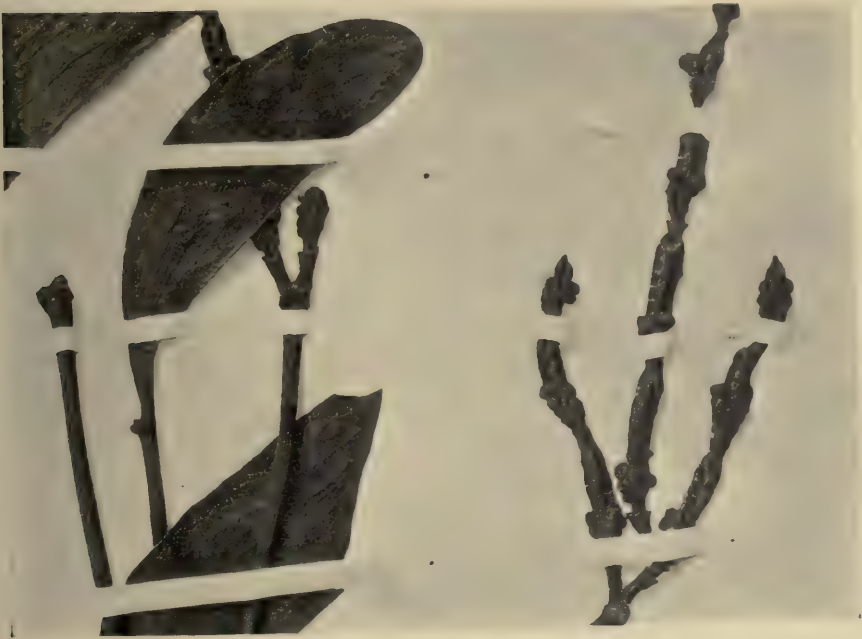
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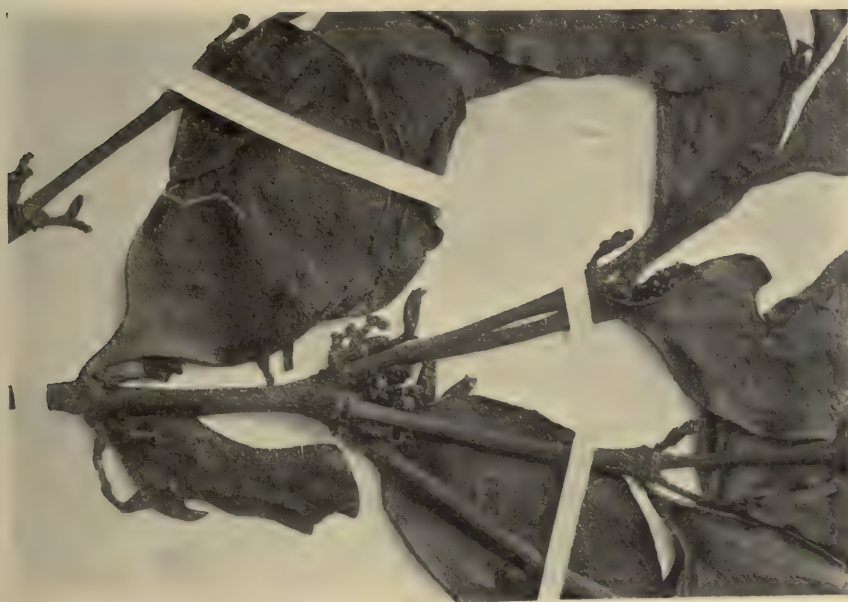
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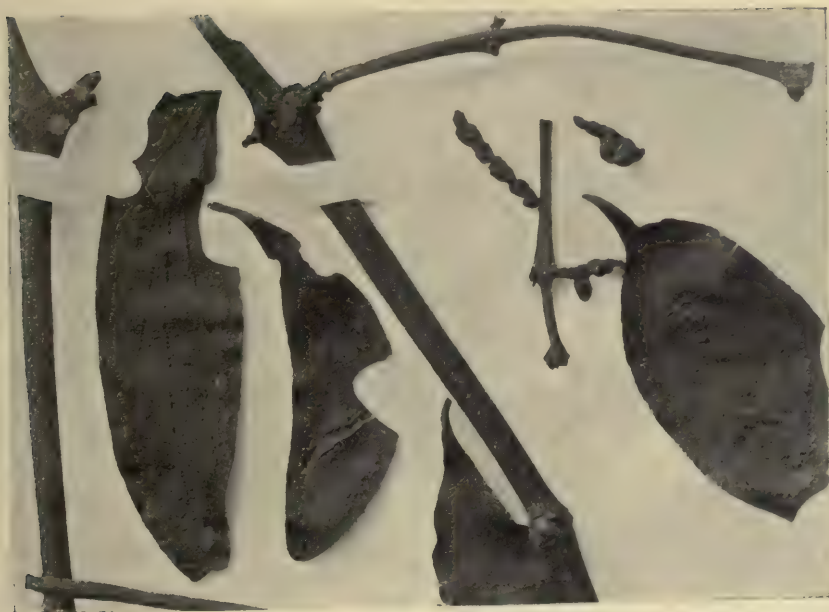
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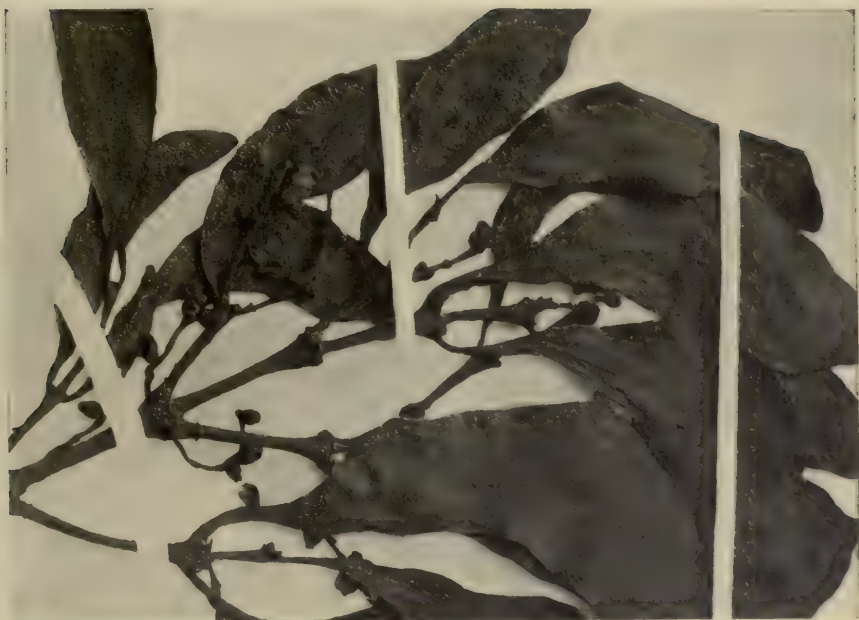
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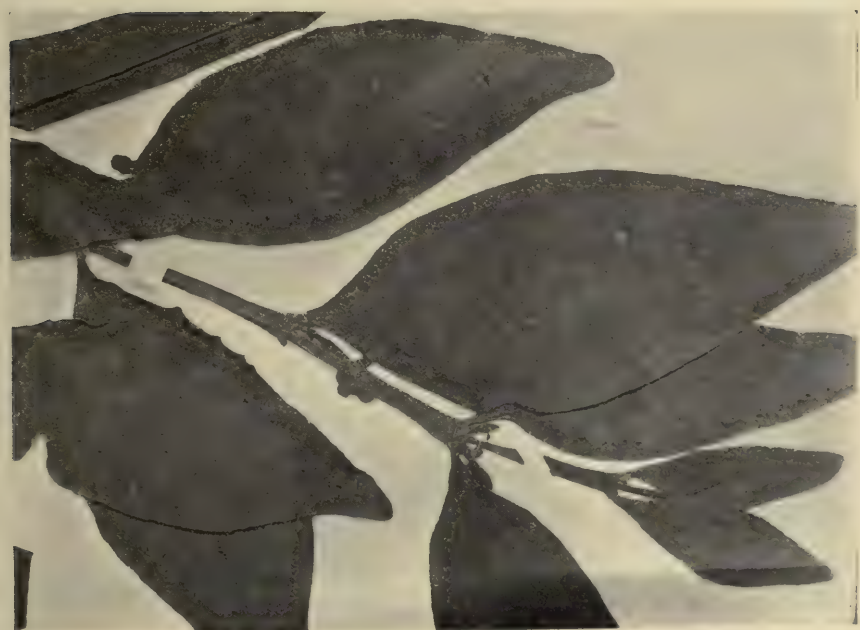
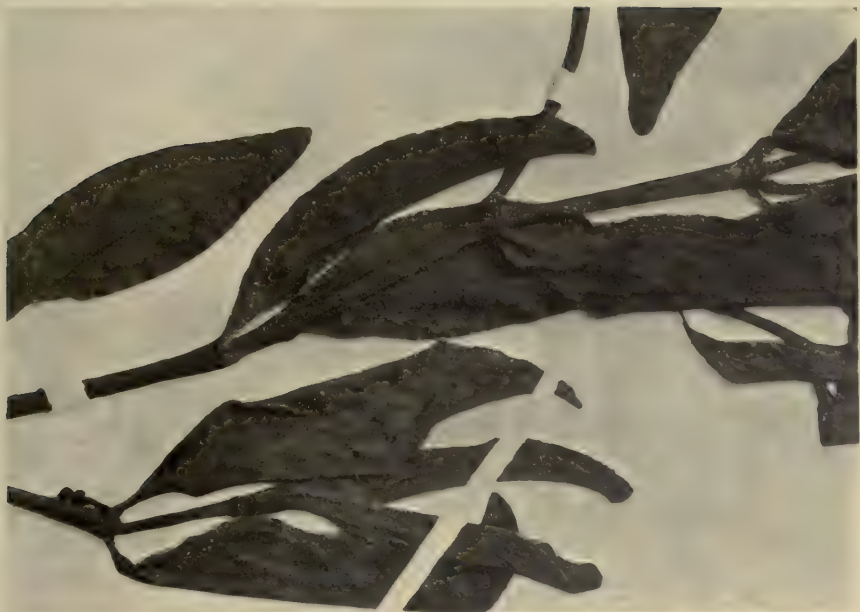
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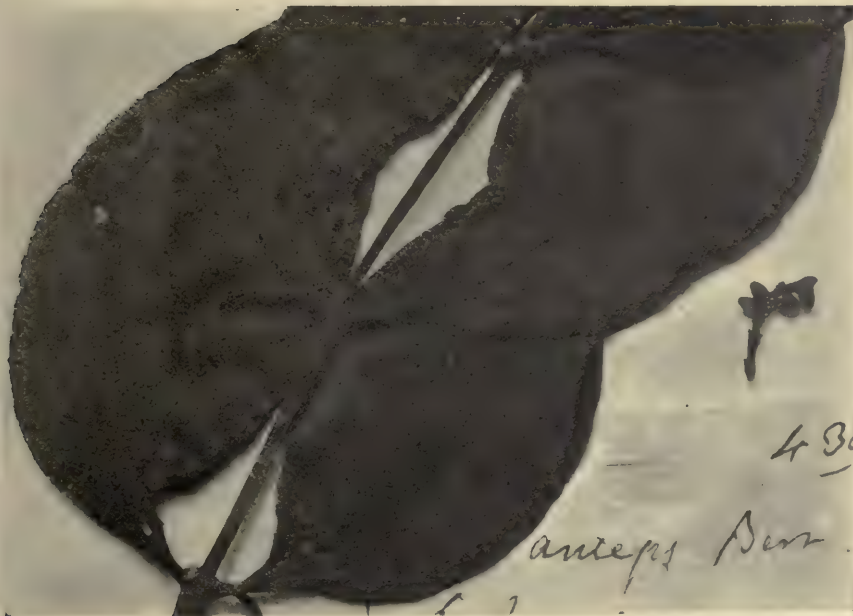
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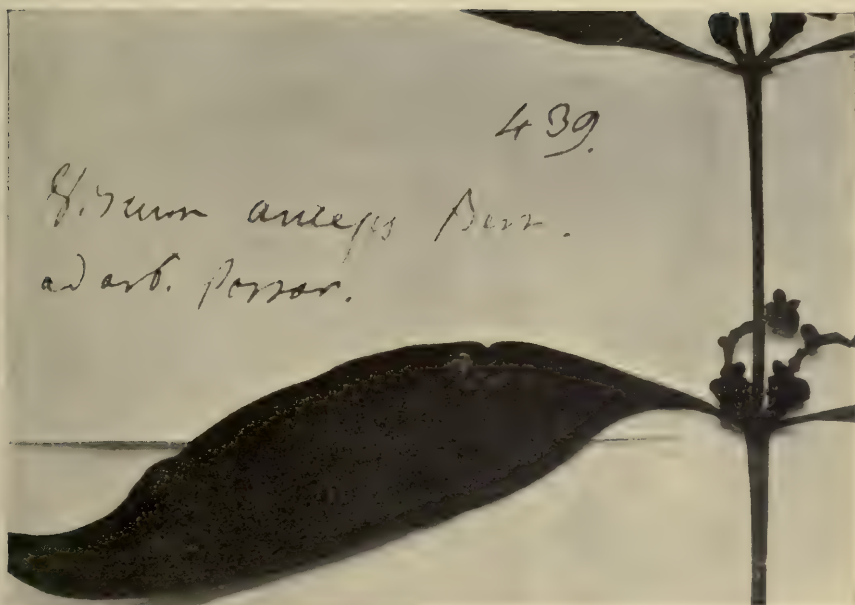
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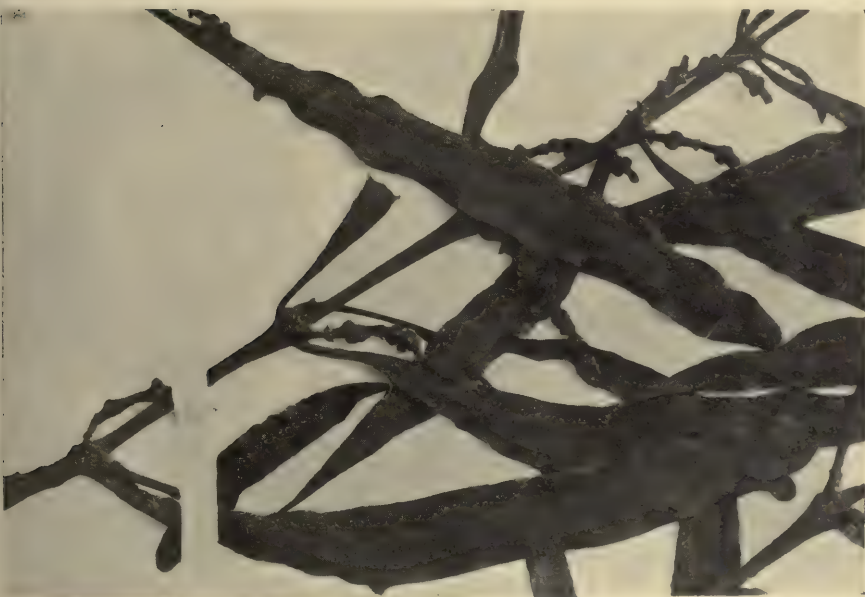
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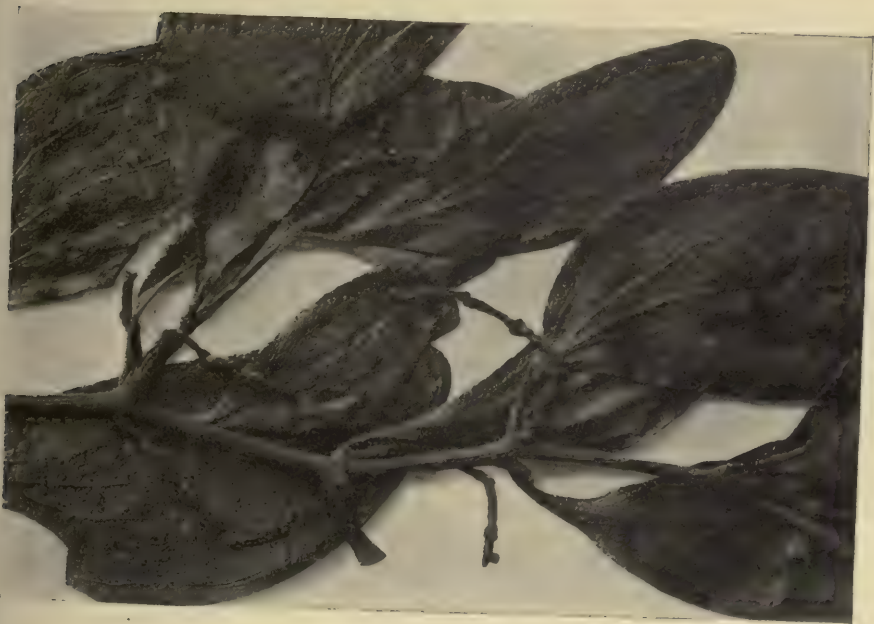
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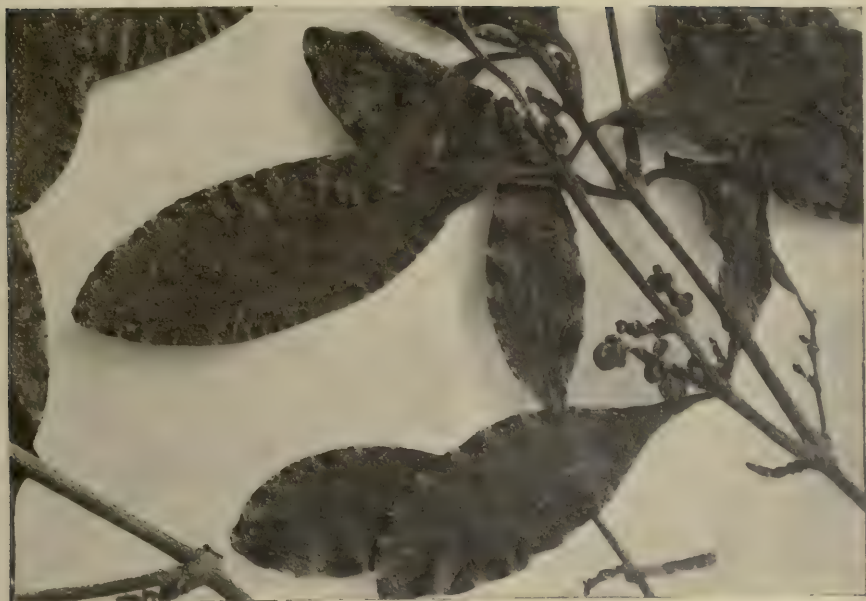
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PHORADENDRON WATTII PRODUCTUM



PHORADENDRON HELLERI



PHORADENDRON HELLERI SANGUINEUM



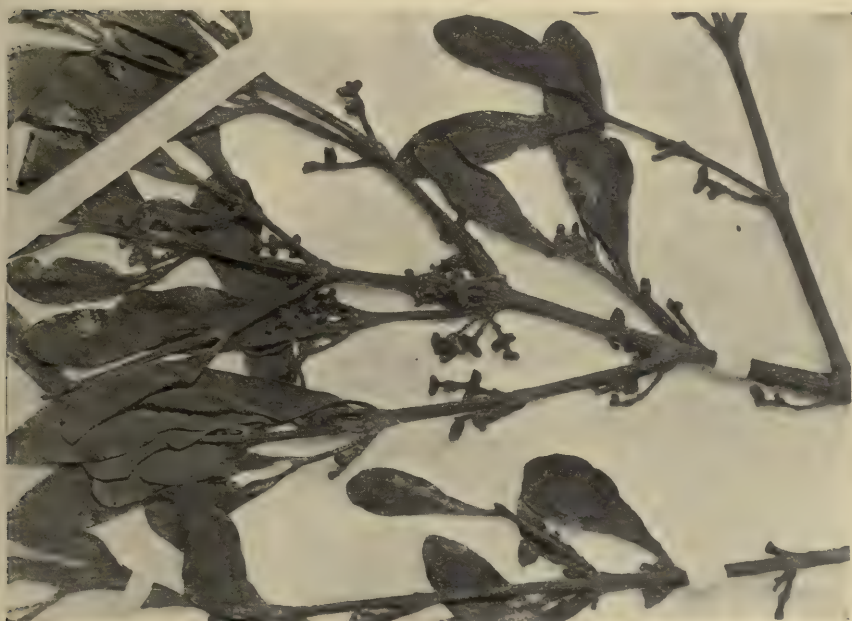
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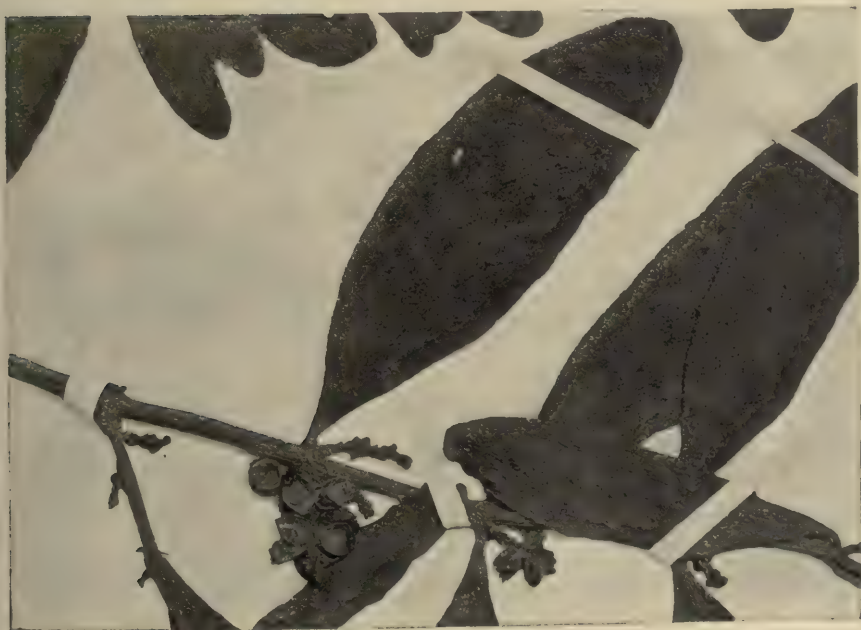
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PHORADENDRON TRINERVIUM



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PHORADENDRON RENSONI



PHORADENDRON ZULOAGAE



PHORADENDRON COMMUTATUM



PHORADENDRON COMMUTATUM



PHORADENDRON RUBRUM



PHORADENDRON RUBRUM



PHORADENDRON QUADRANGULARE



PHORADENDRON QUADRANGULARE



PHORADENDRON VISCIFOLIUM



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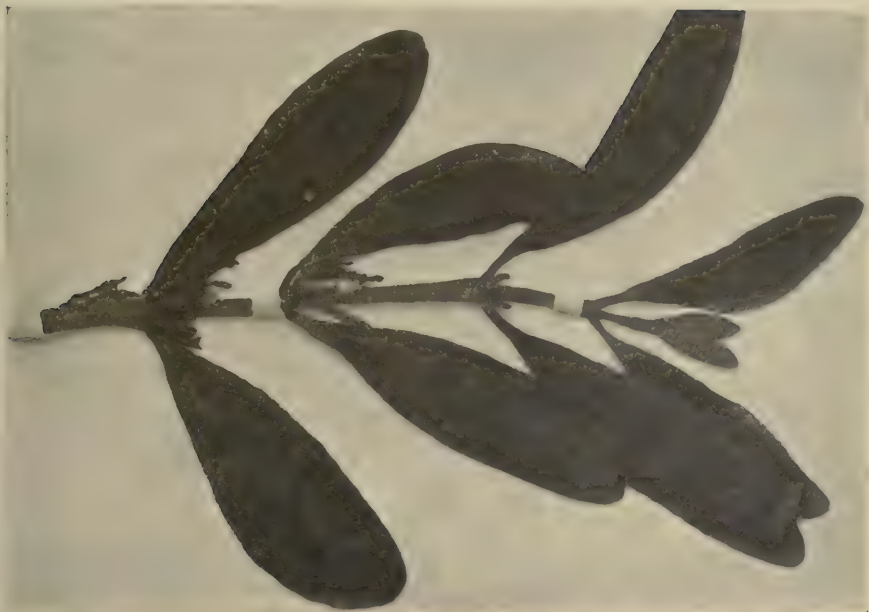
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PHORADENDRON ANTILLARUM ORIENTALE



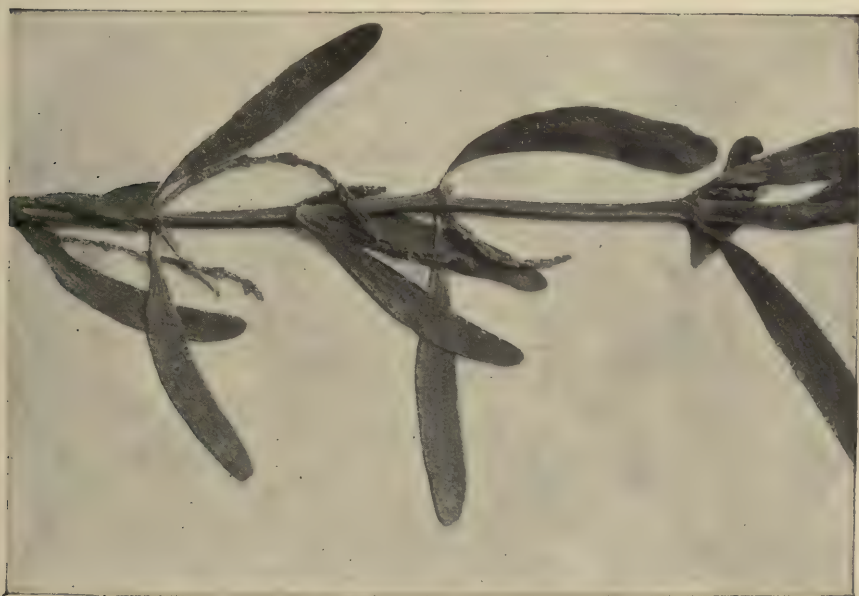
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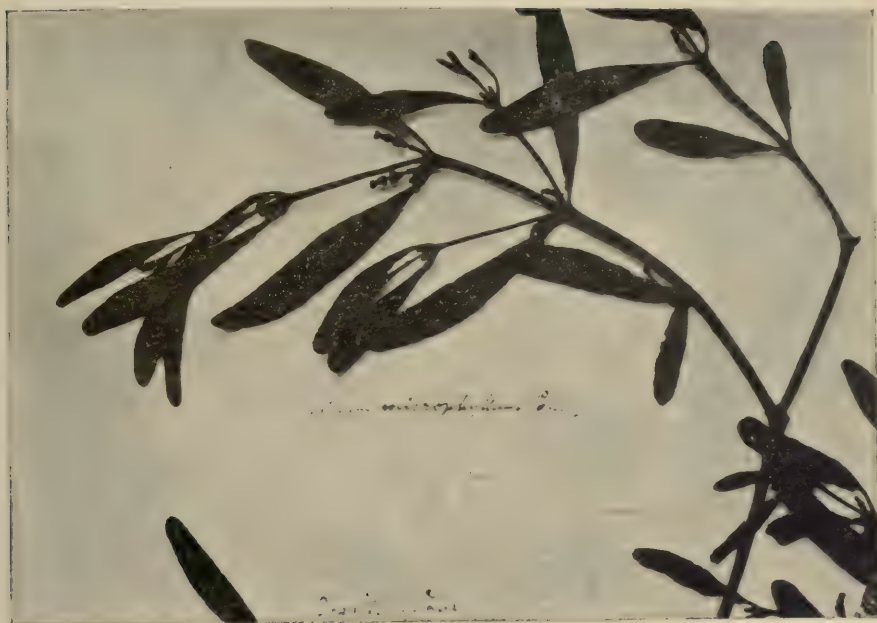
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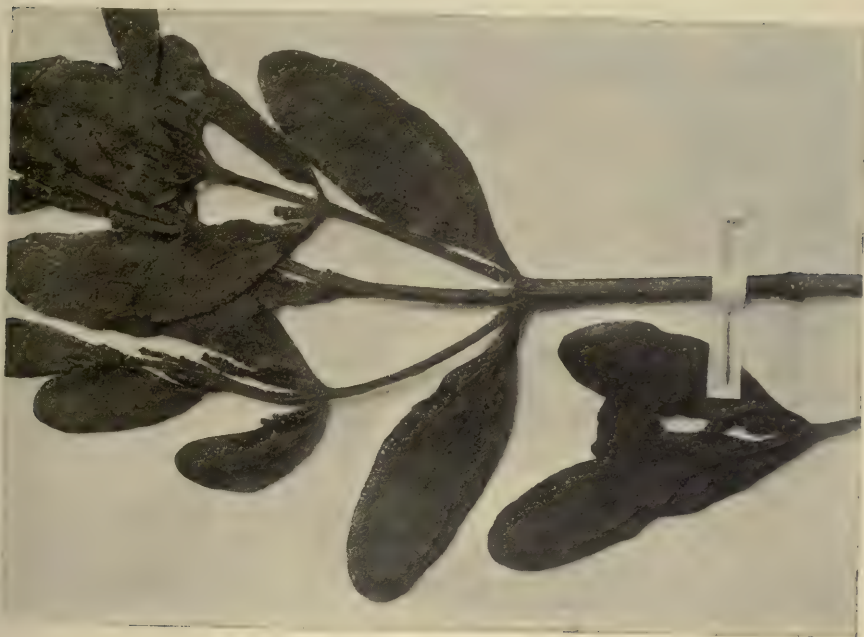
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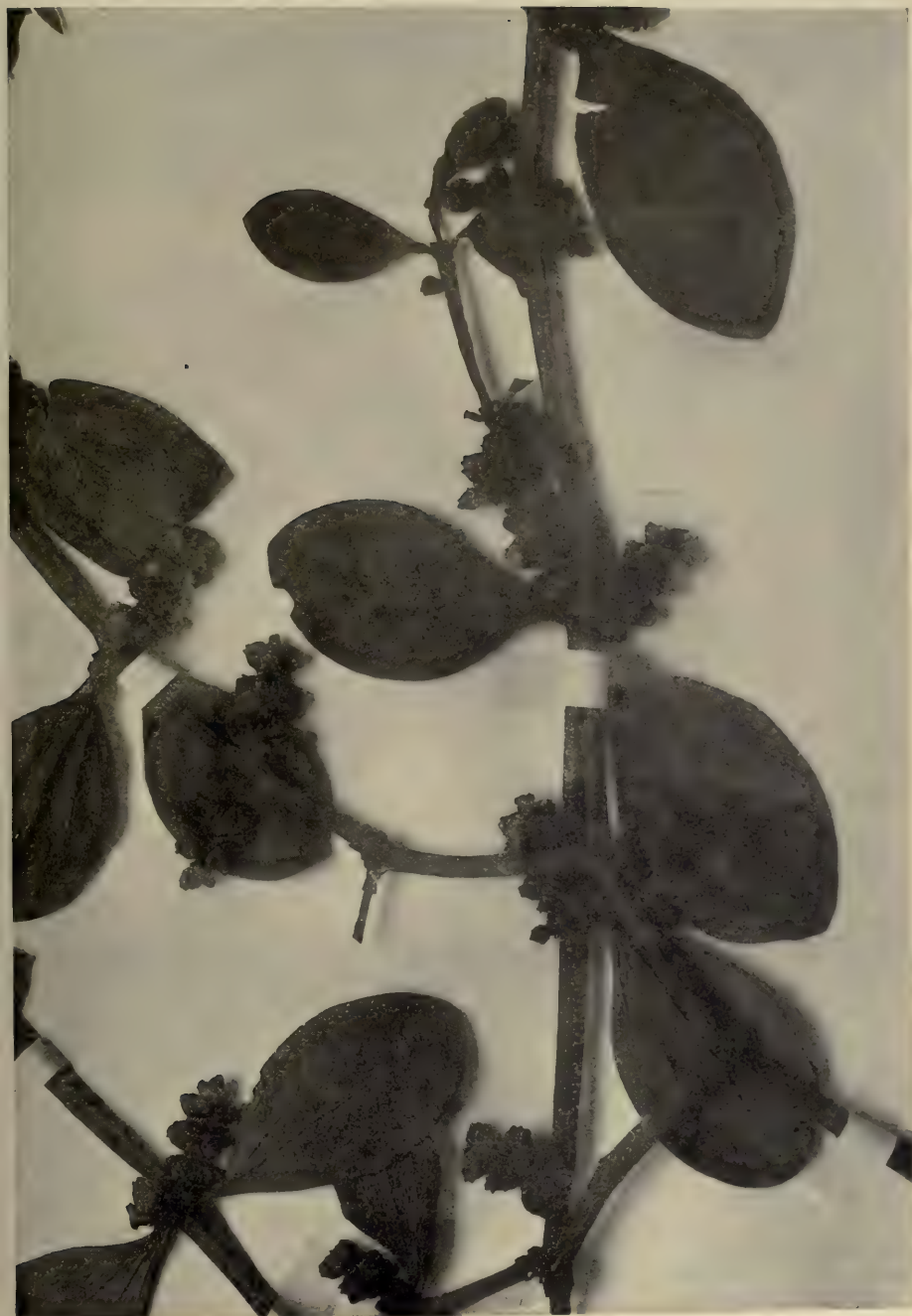
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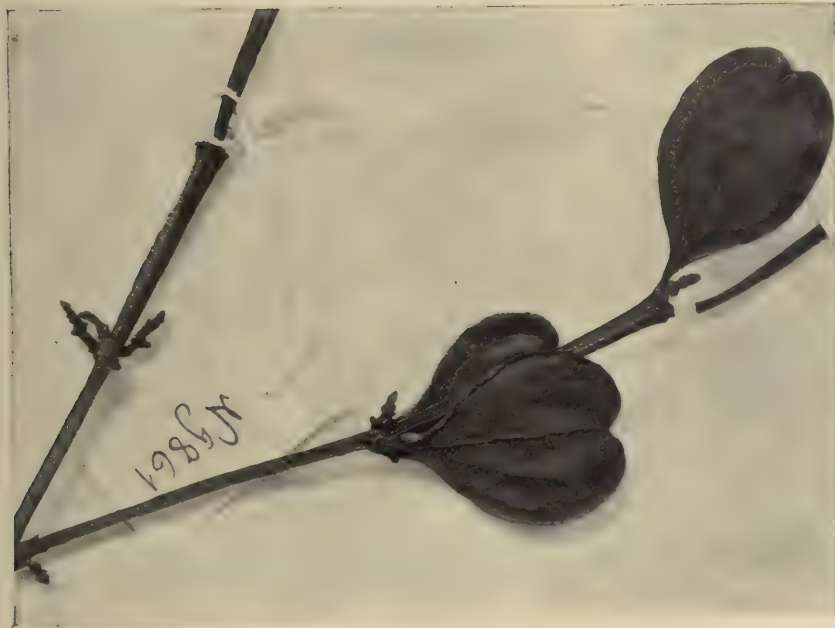
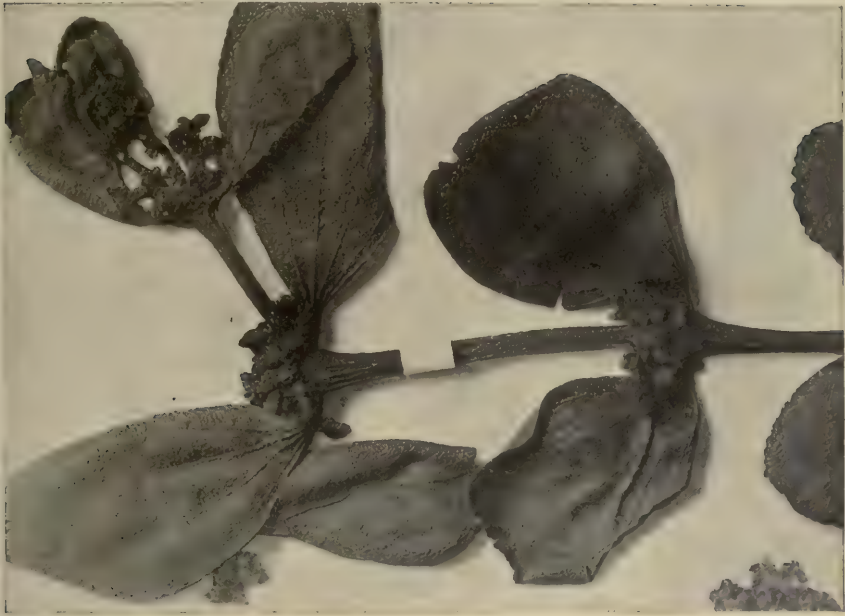
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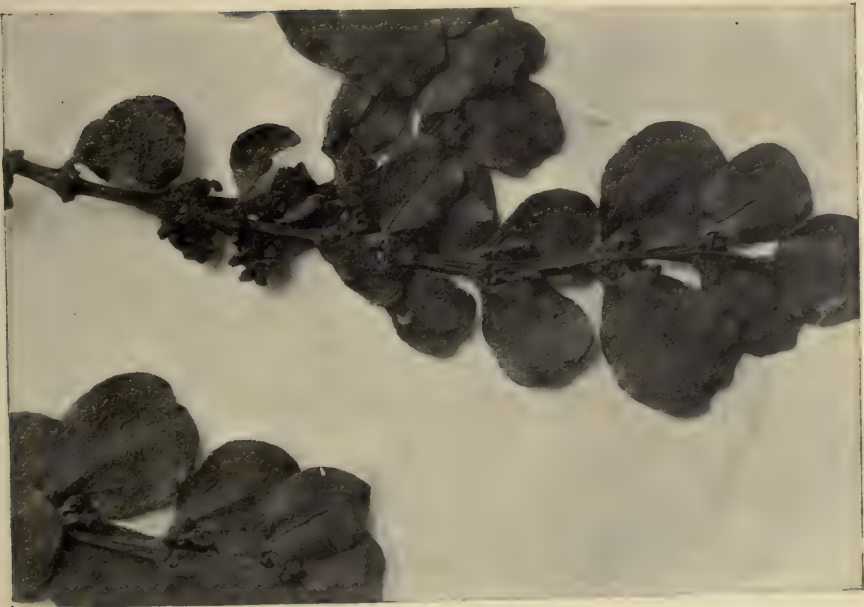
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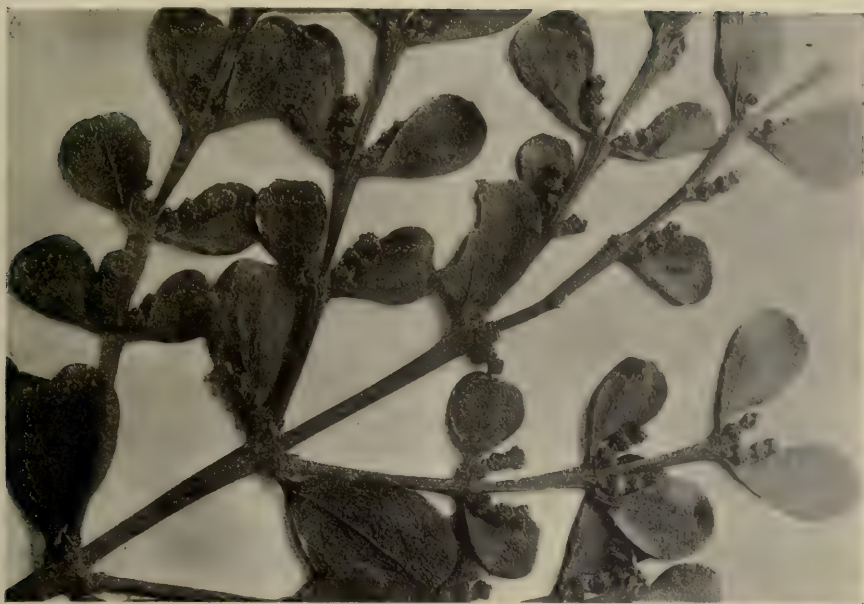
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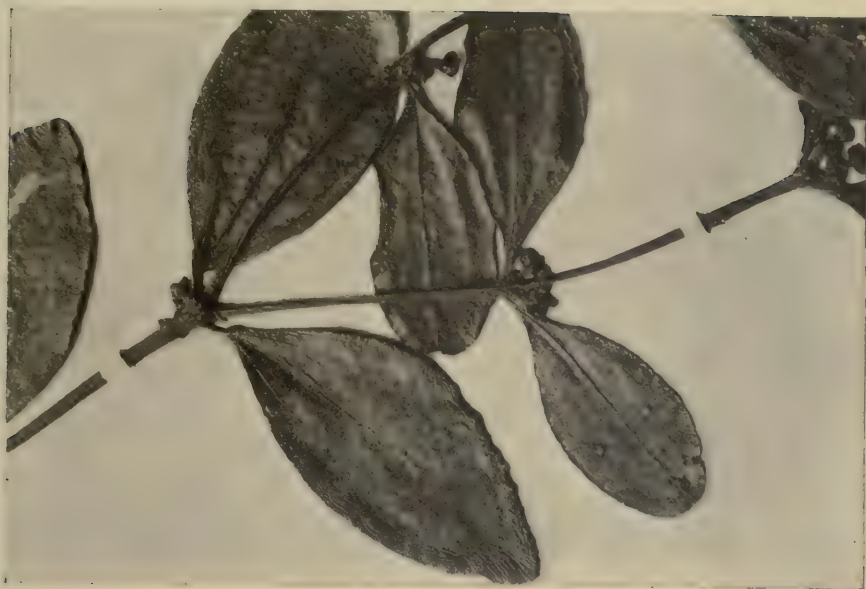
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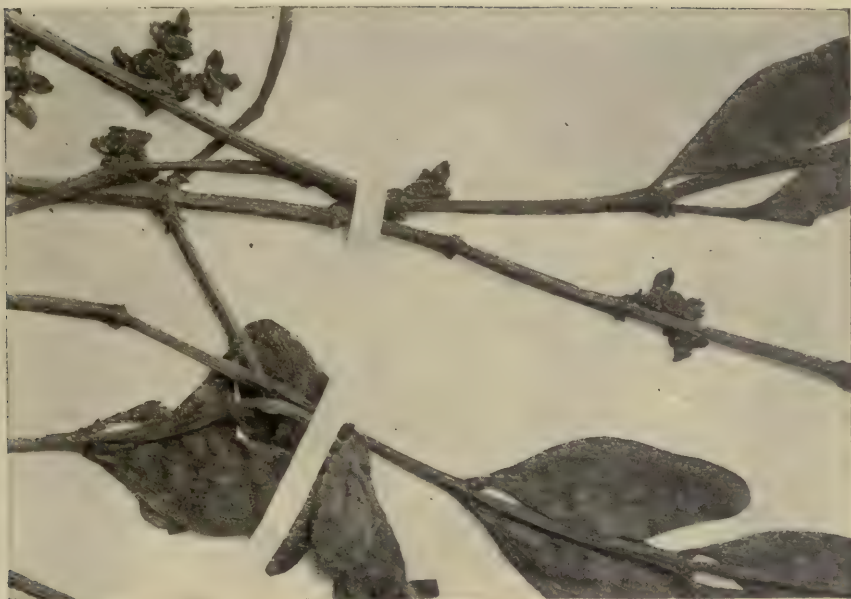
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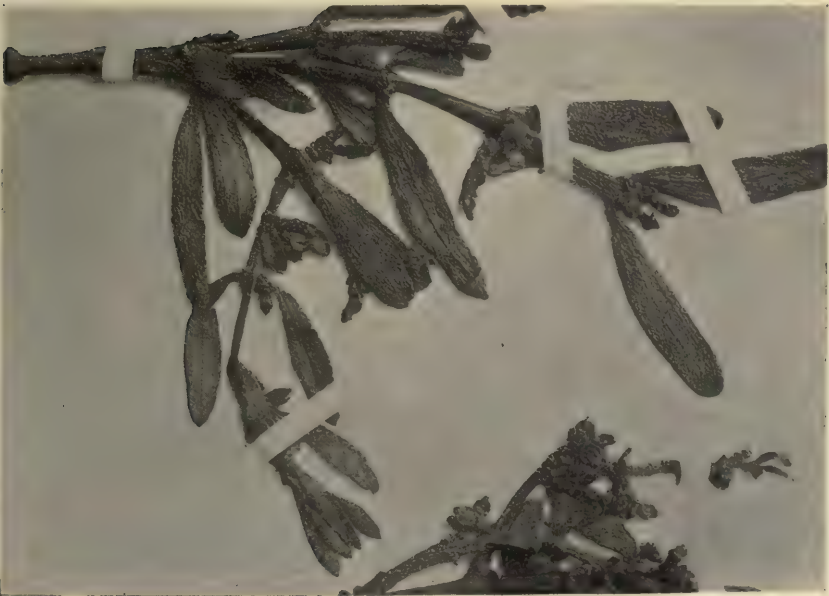


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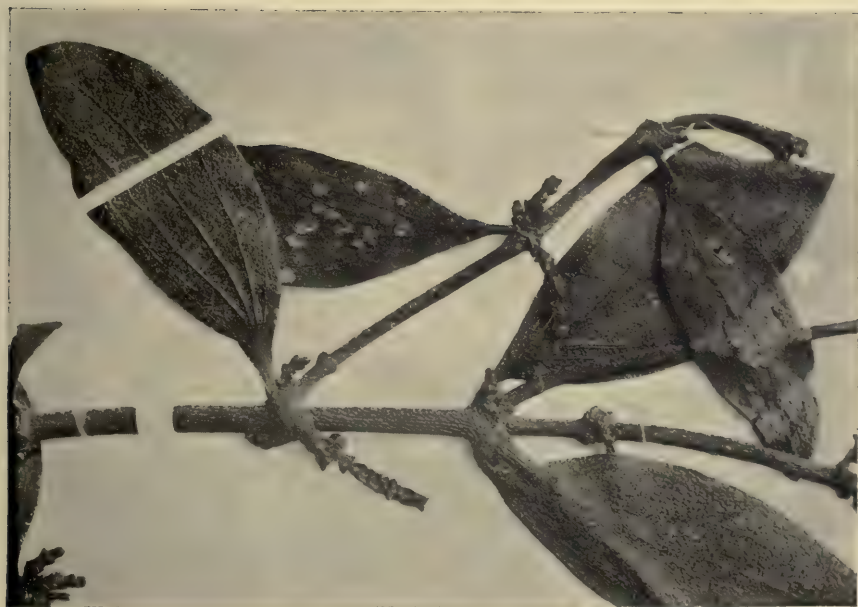
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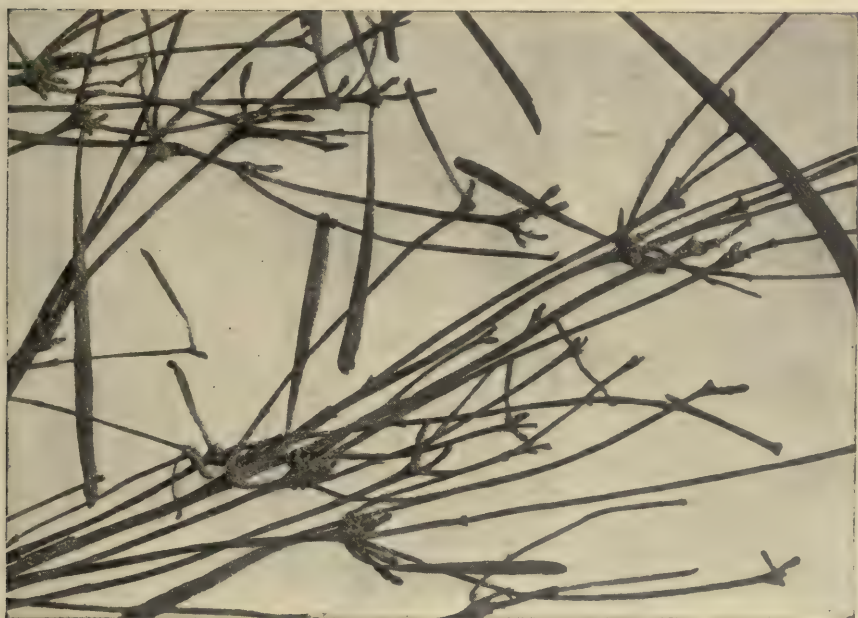
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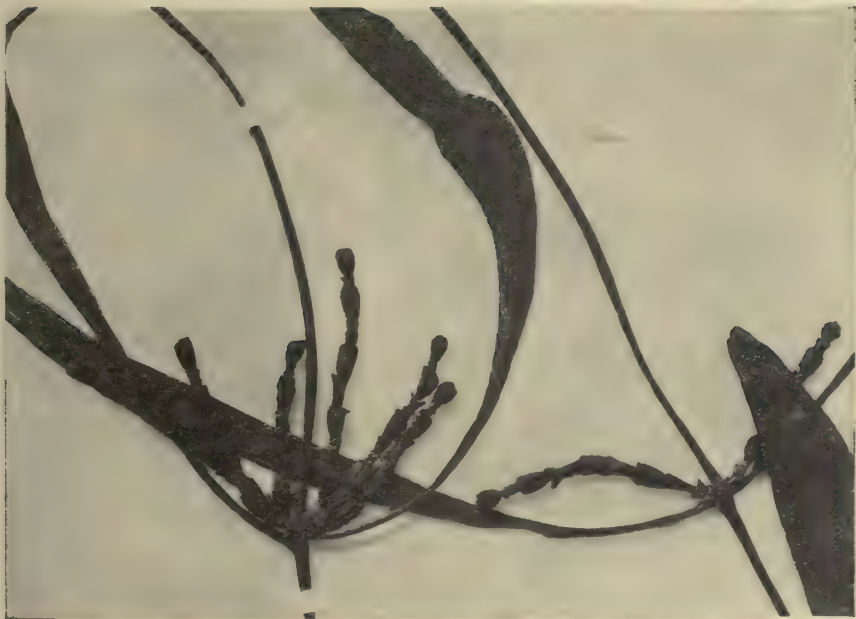
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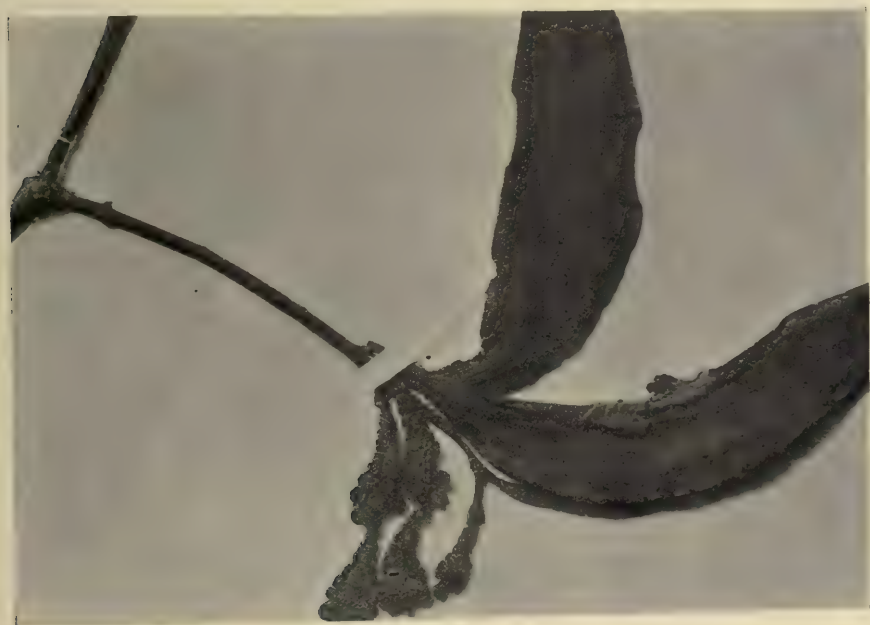
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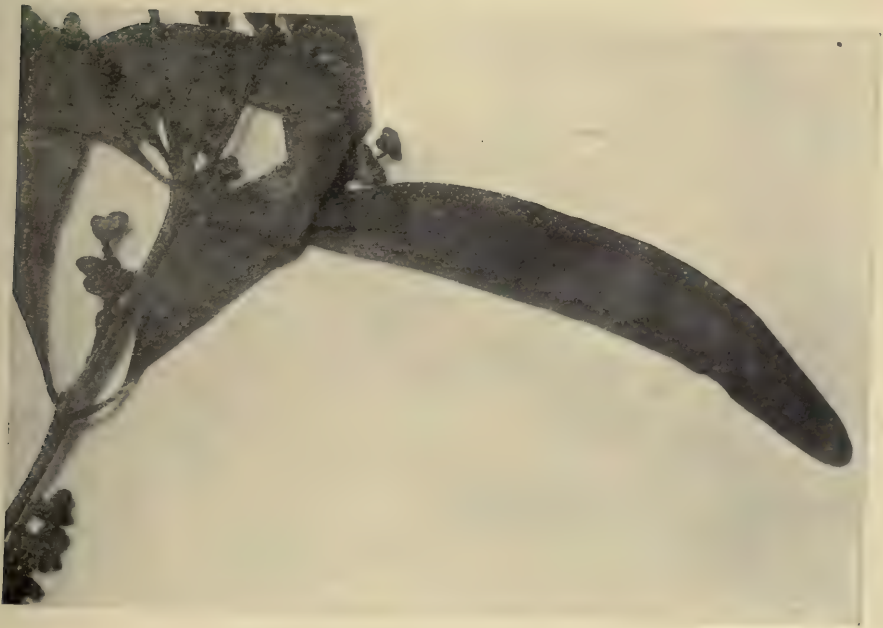
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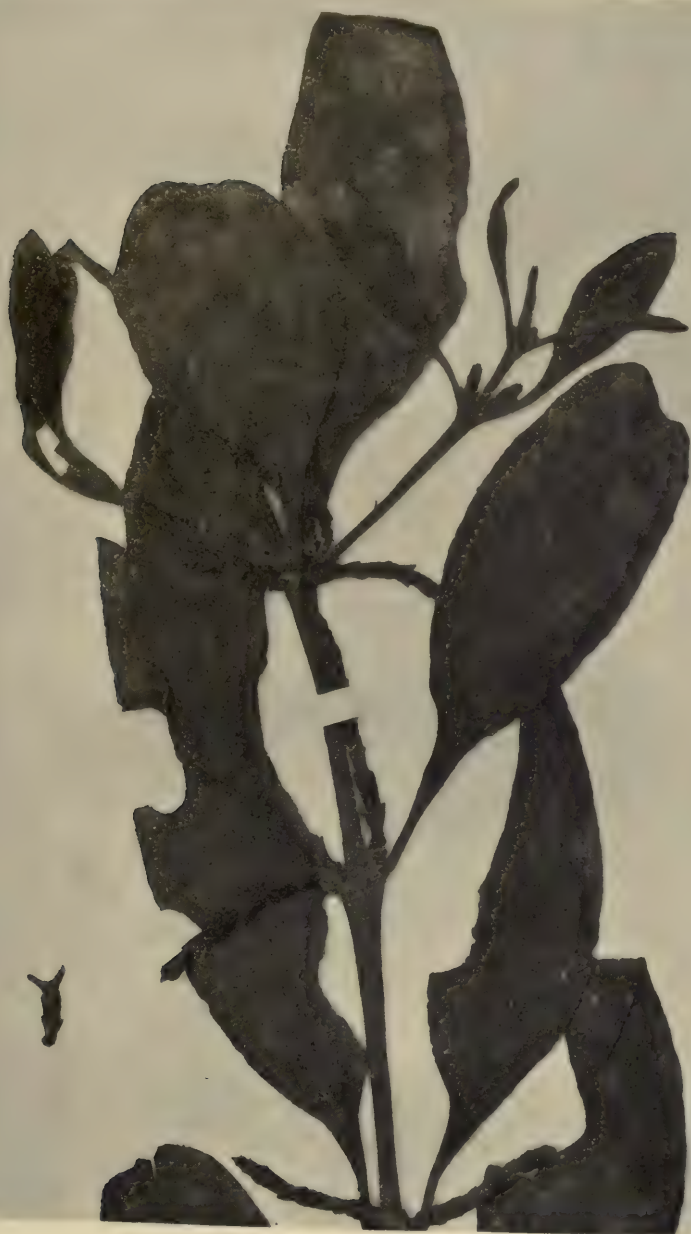
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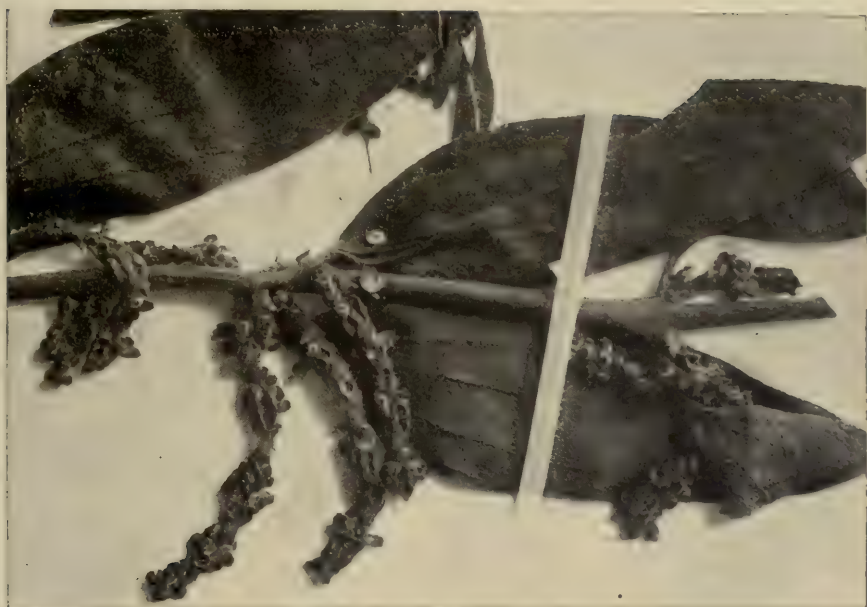
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PHORADENDRON FALCIFRONS



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PHORADENDRON TUCUMANENSE



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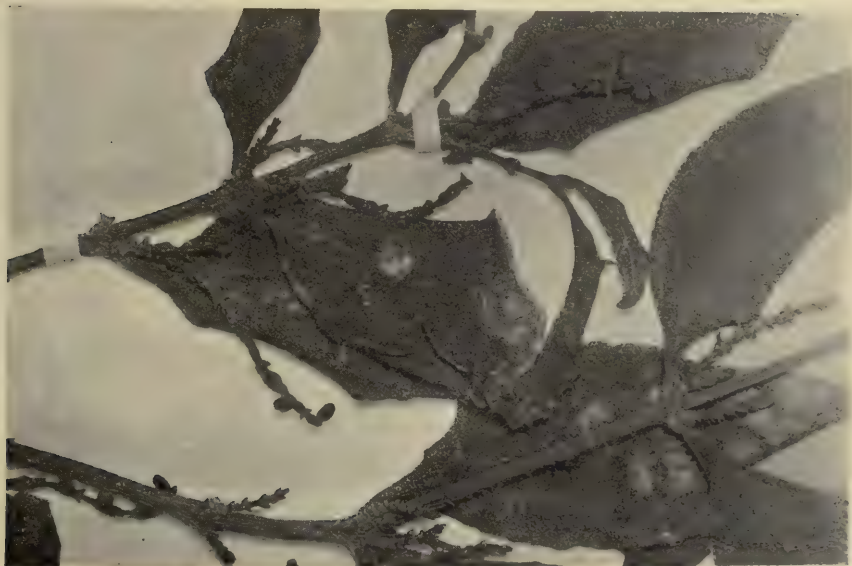
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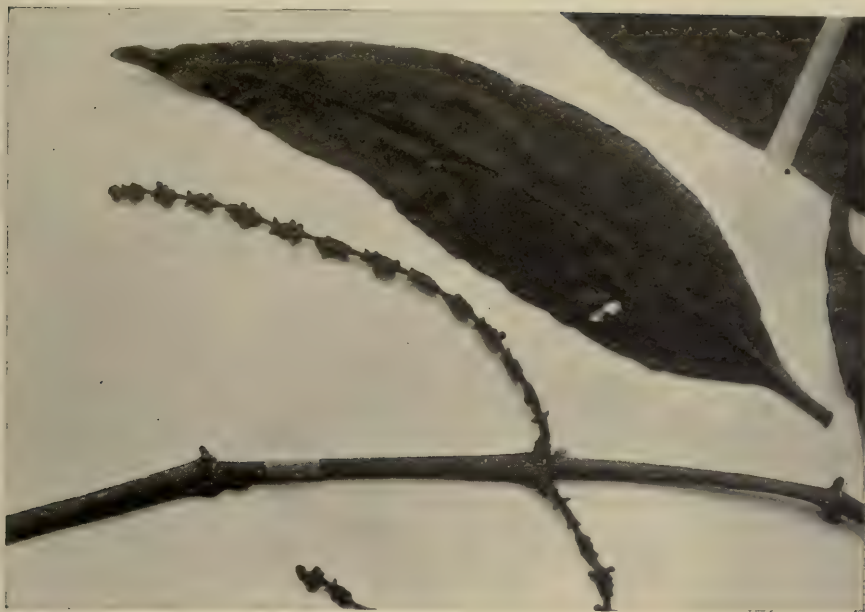
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PHORADENDRON UNDULATUM



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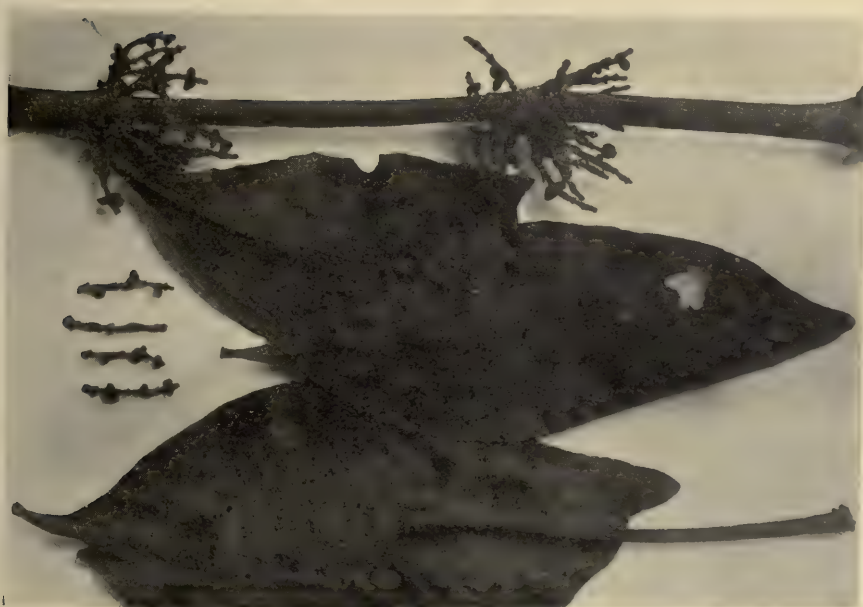
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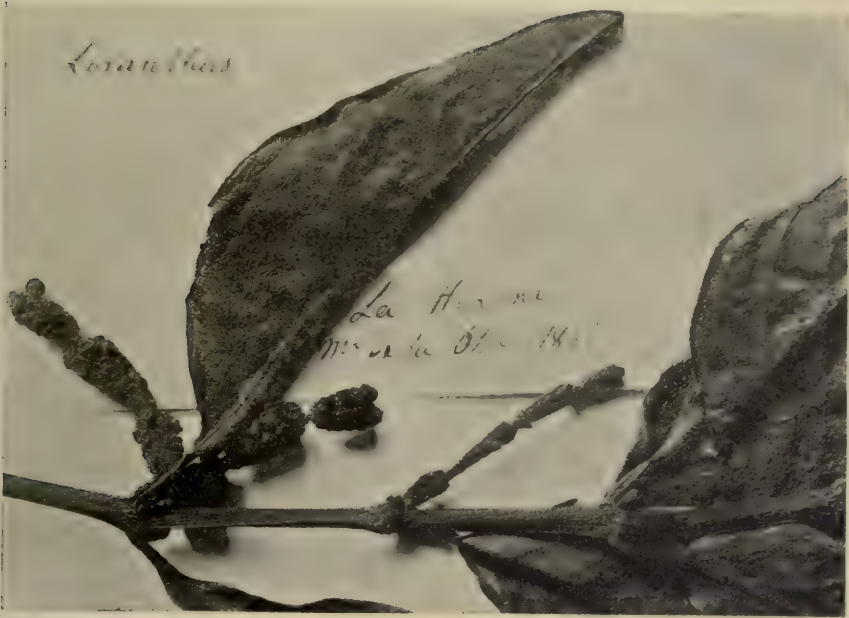
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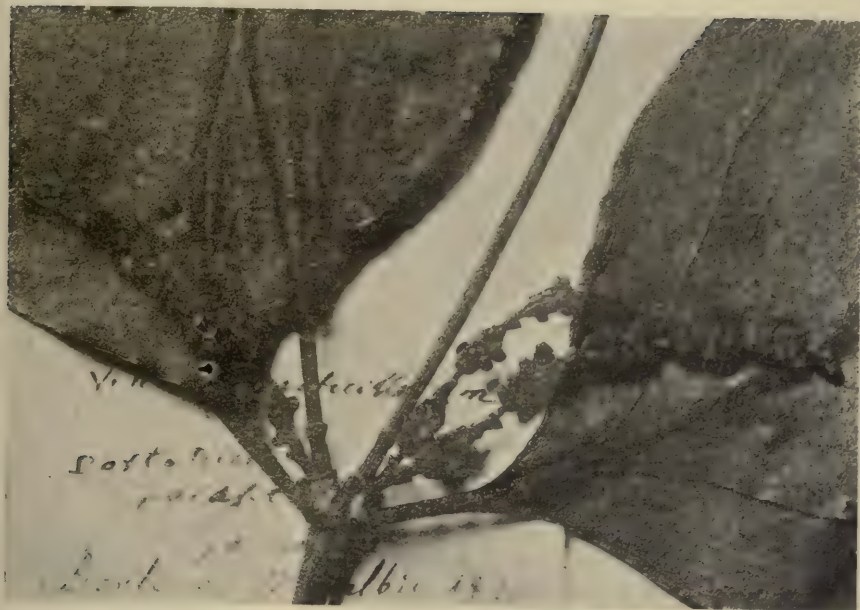
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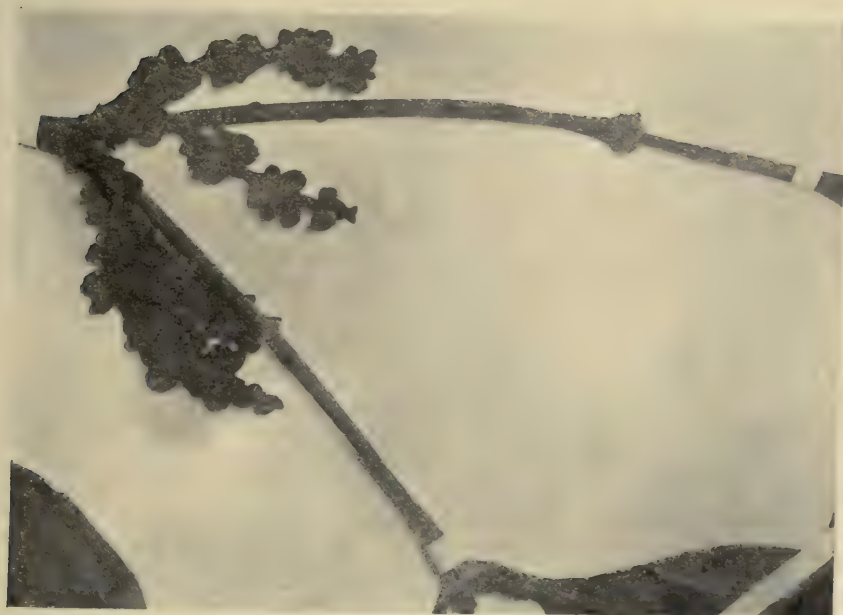
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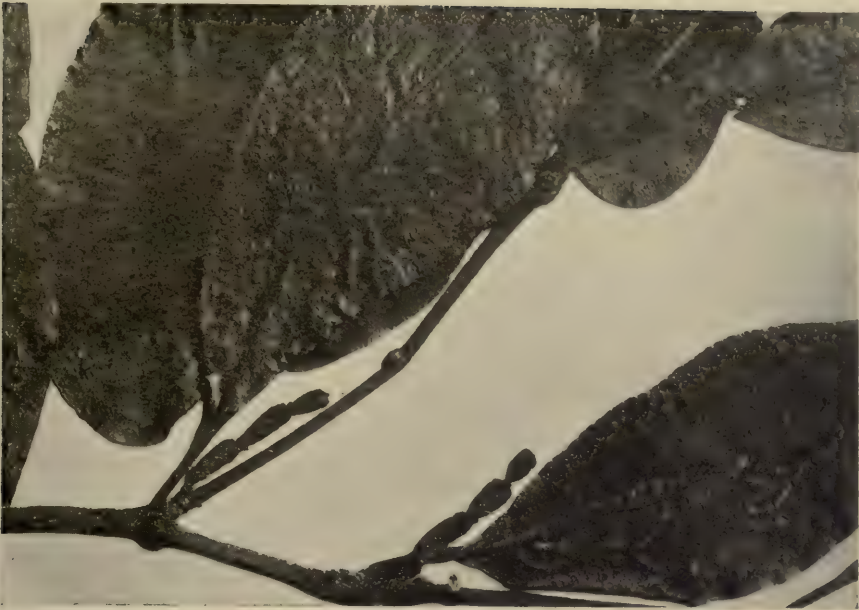
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PHORADENDRON RACEMOSUM



PHORADENDRON RACEMOSUM



PHORADENDRON PRODUCTIPES



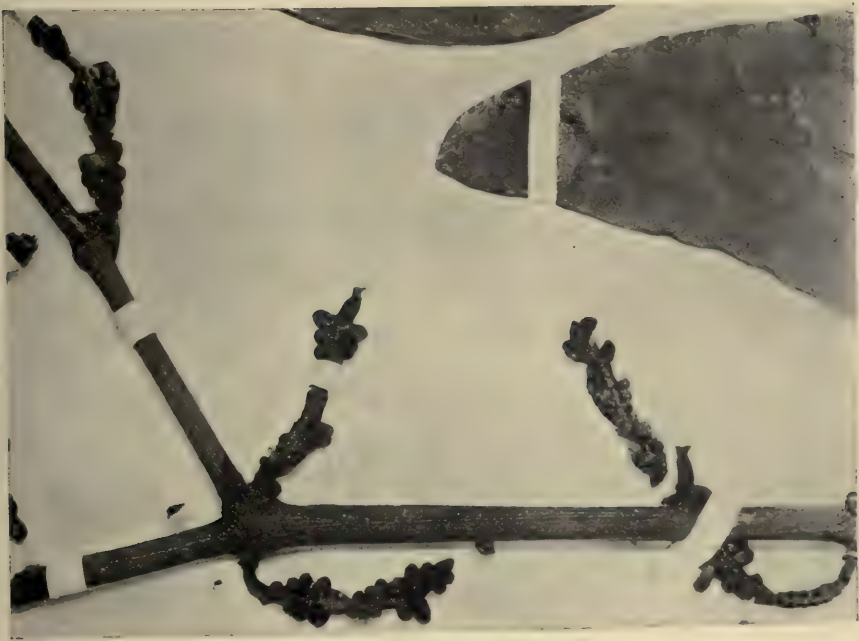
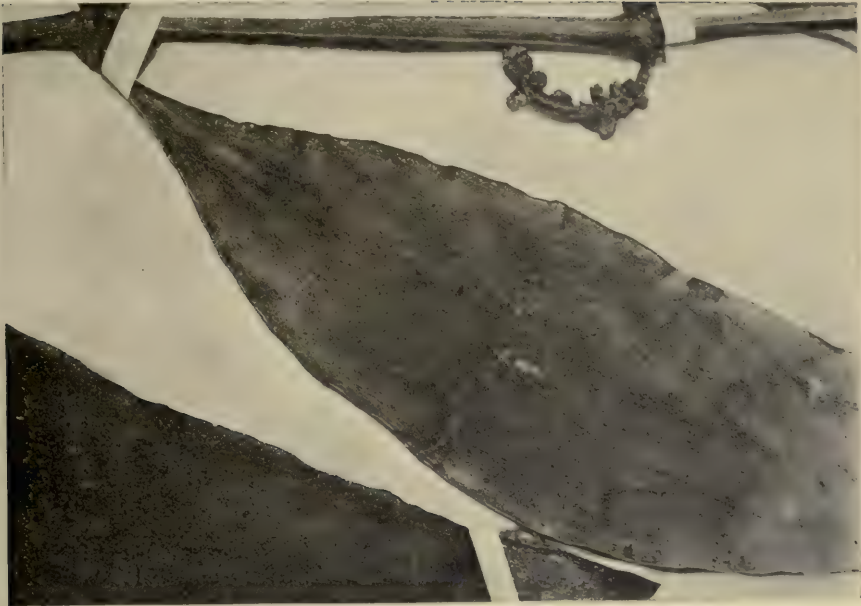
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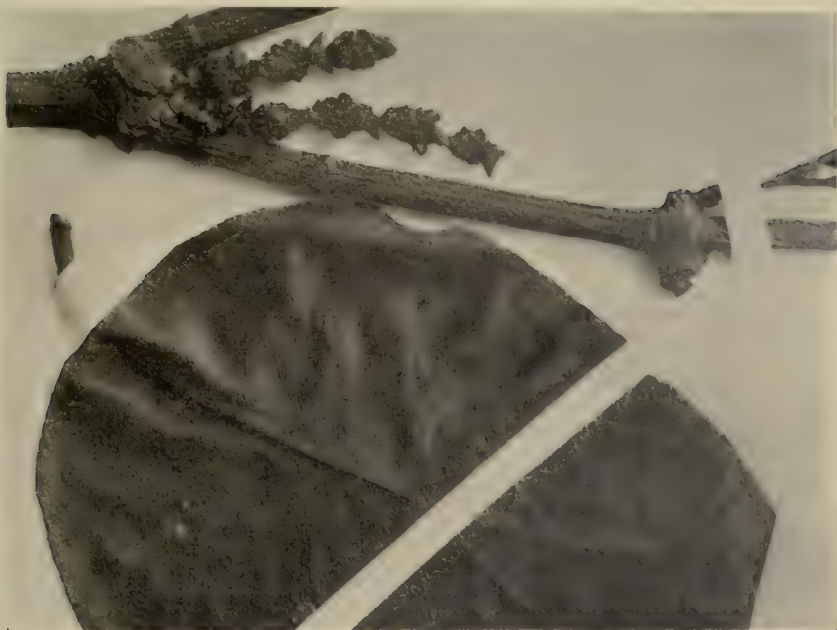
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PHORADENDRON CERINOCARPUM



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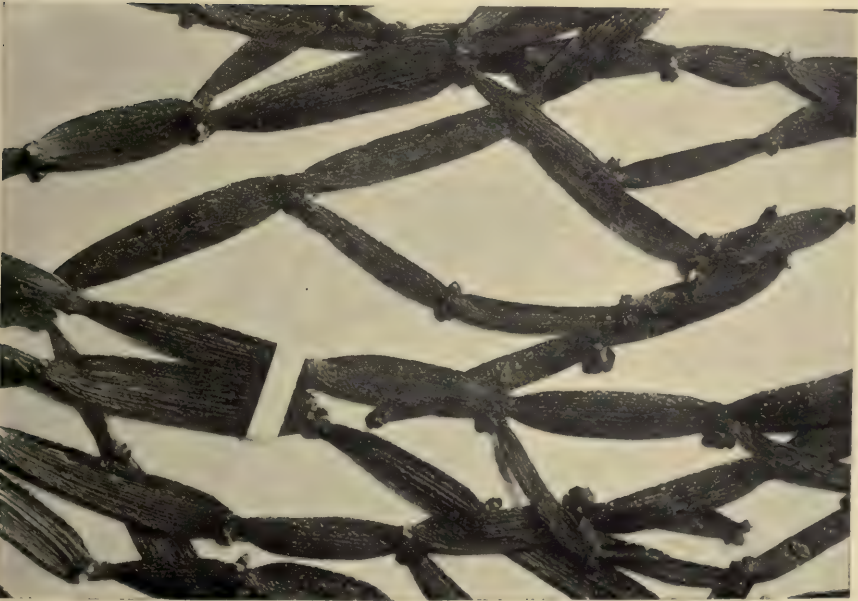
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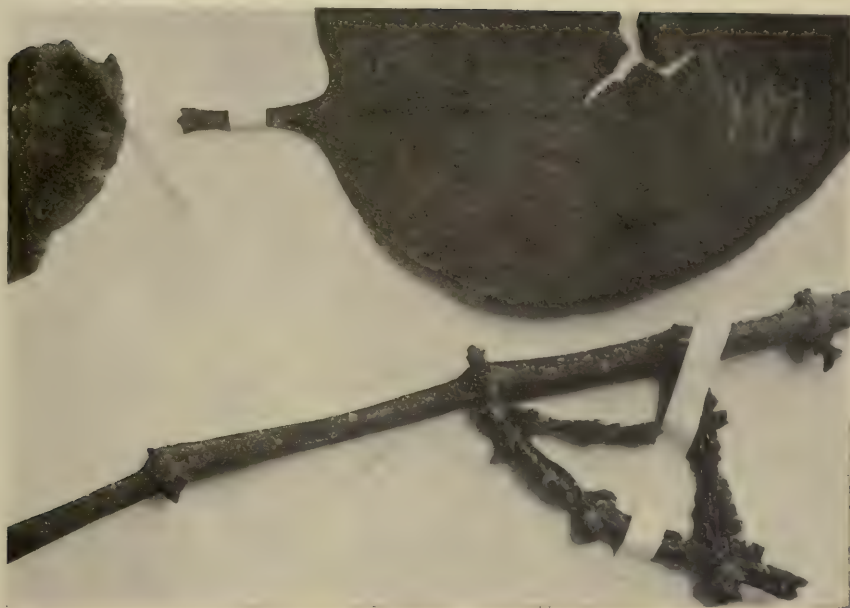
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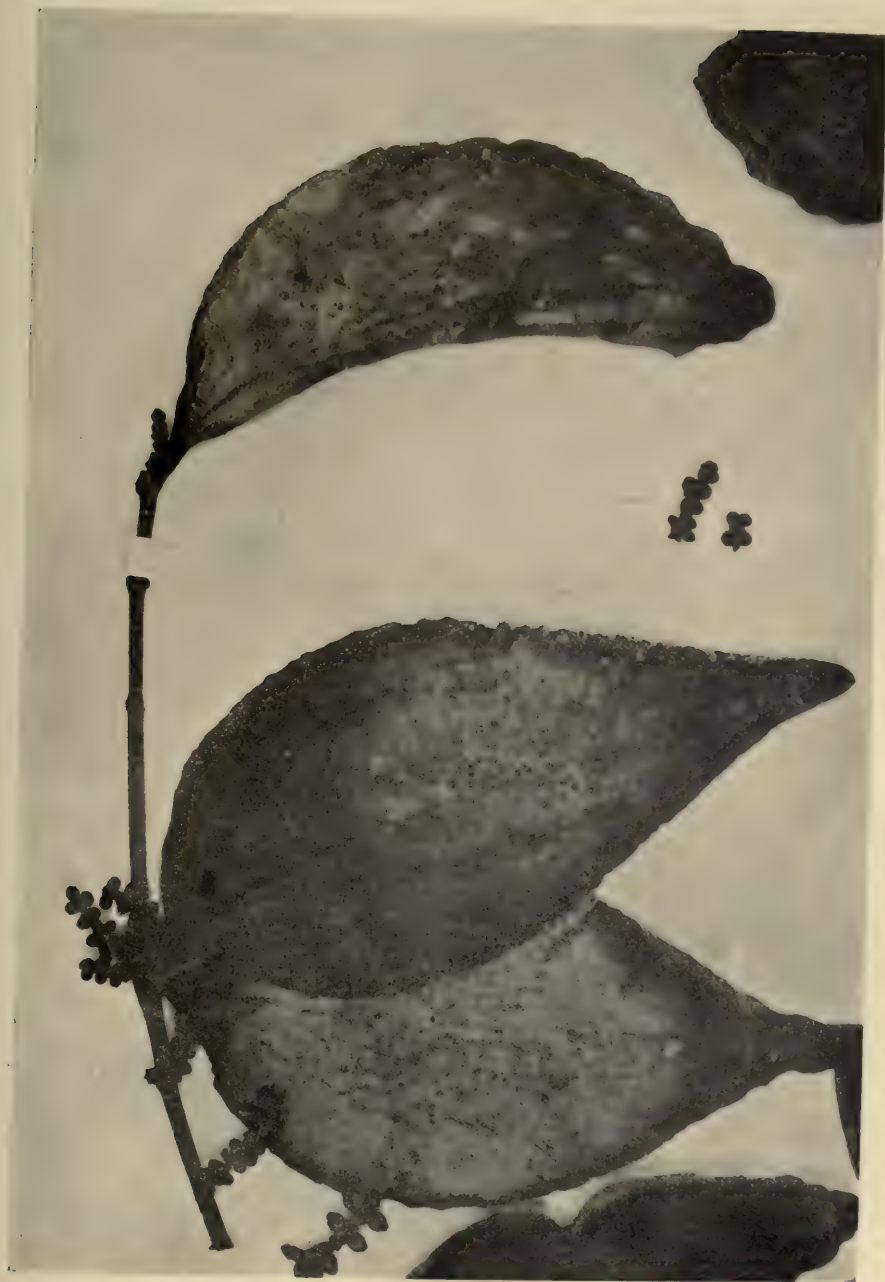
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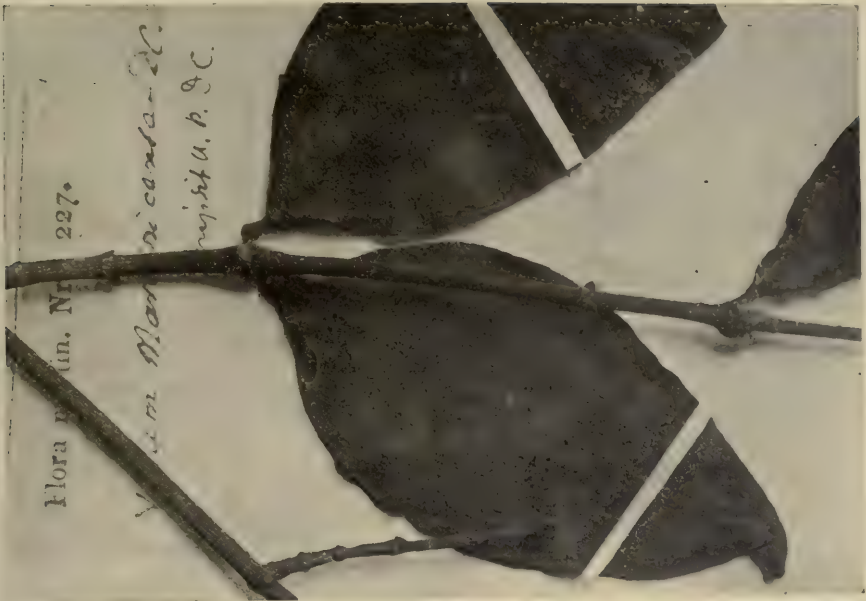
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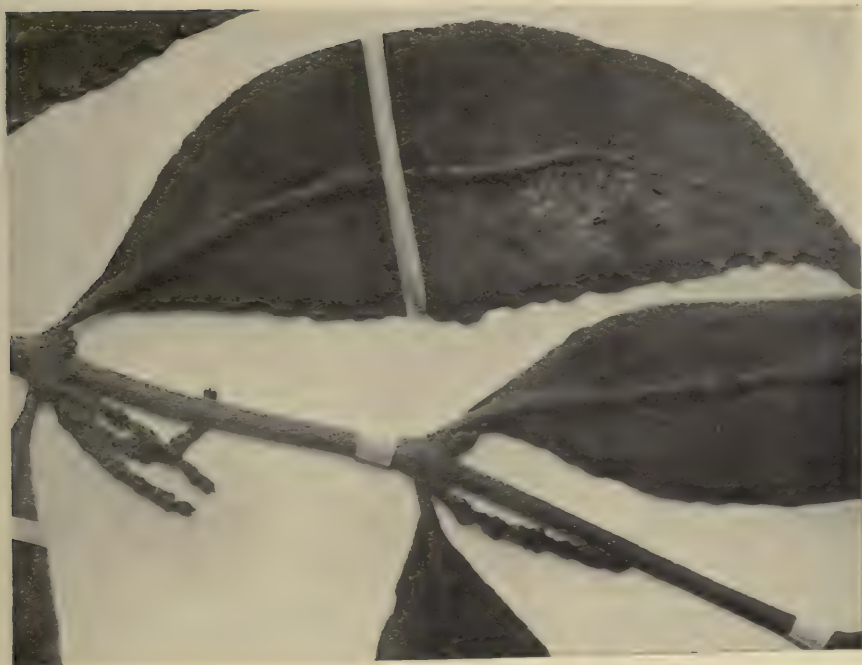
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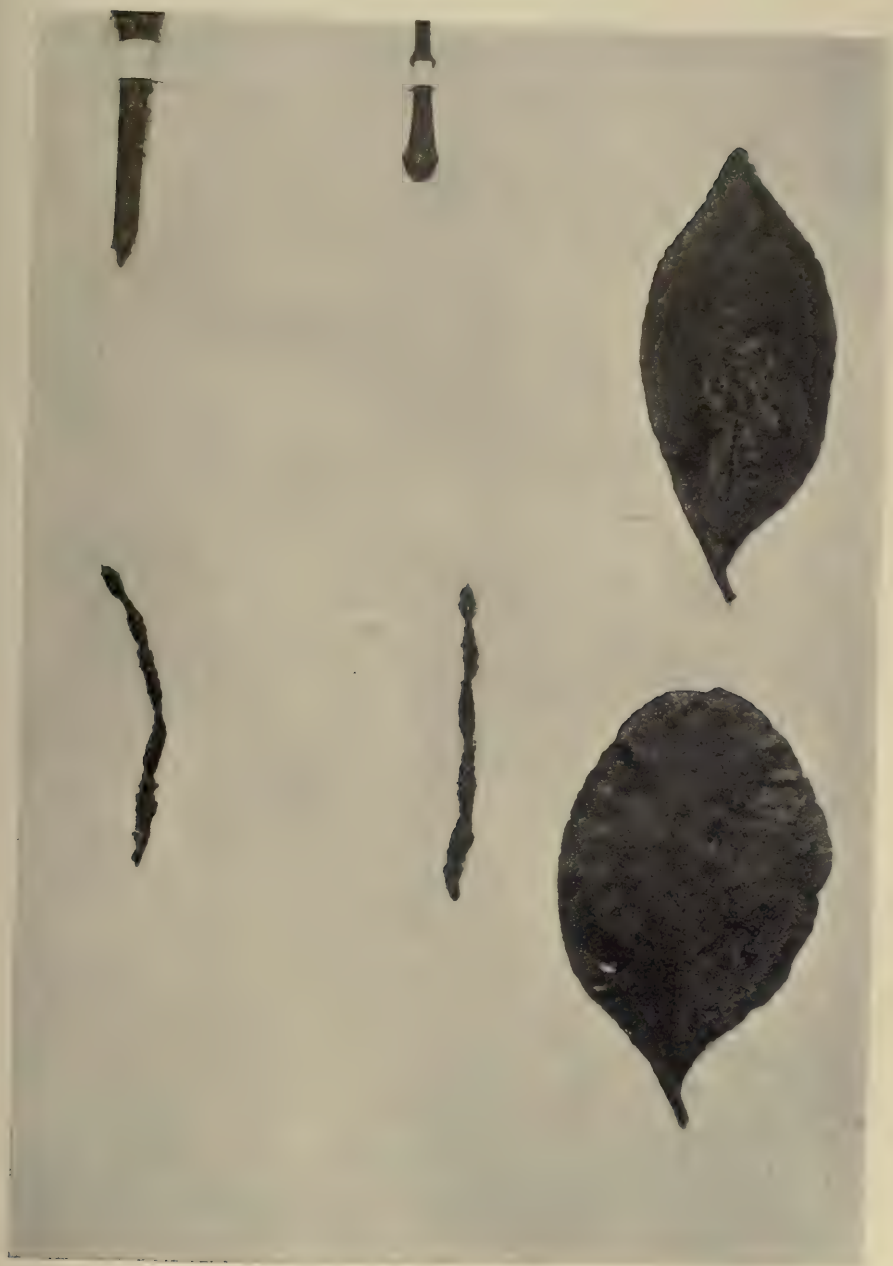
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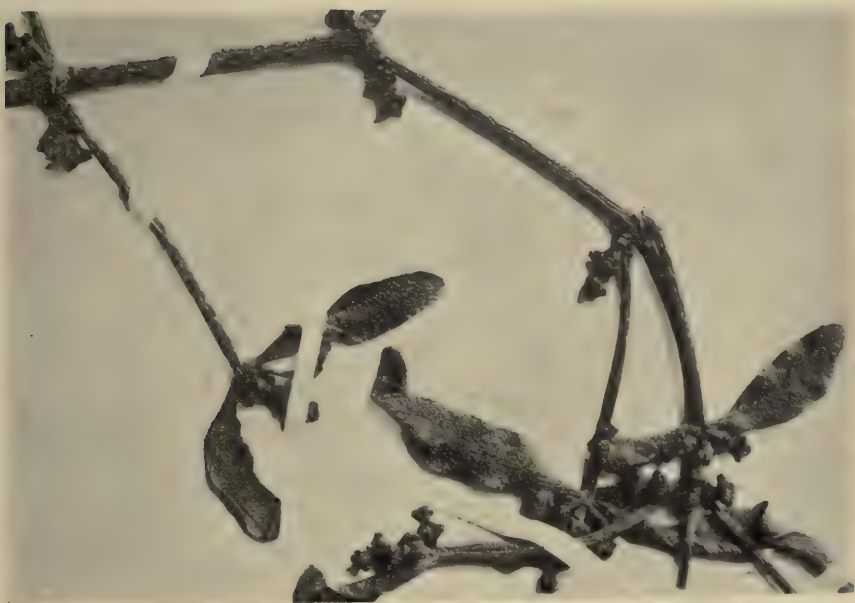
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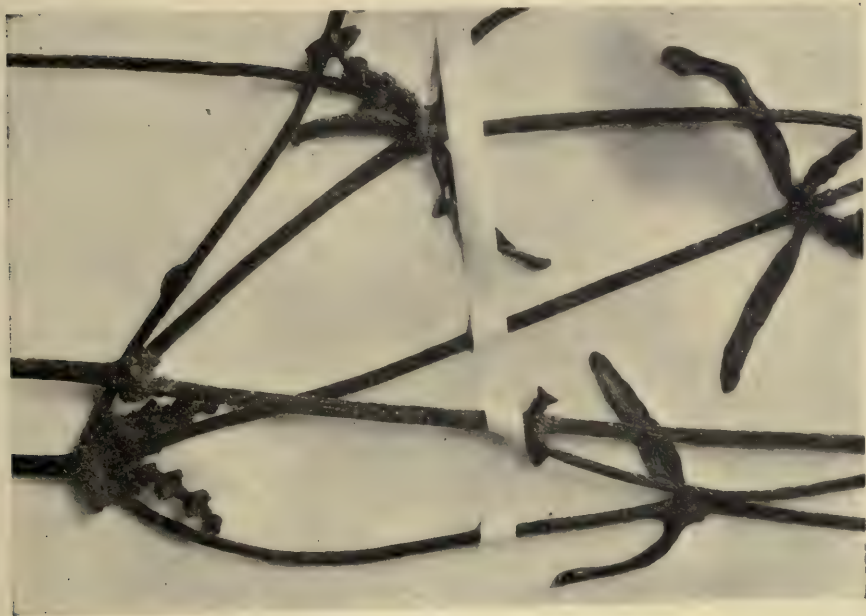
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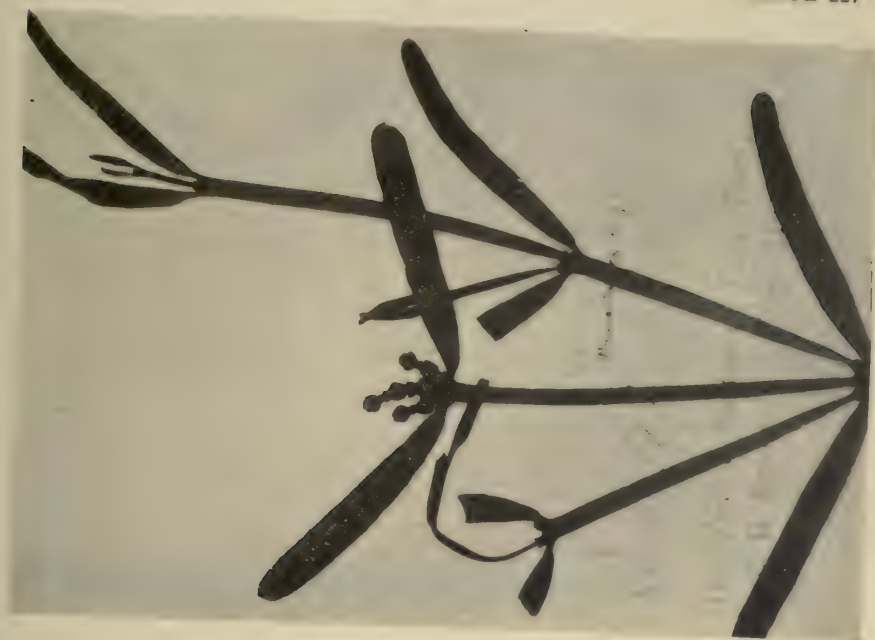
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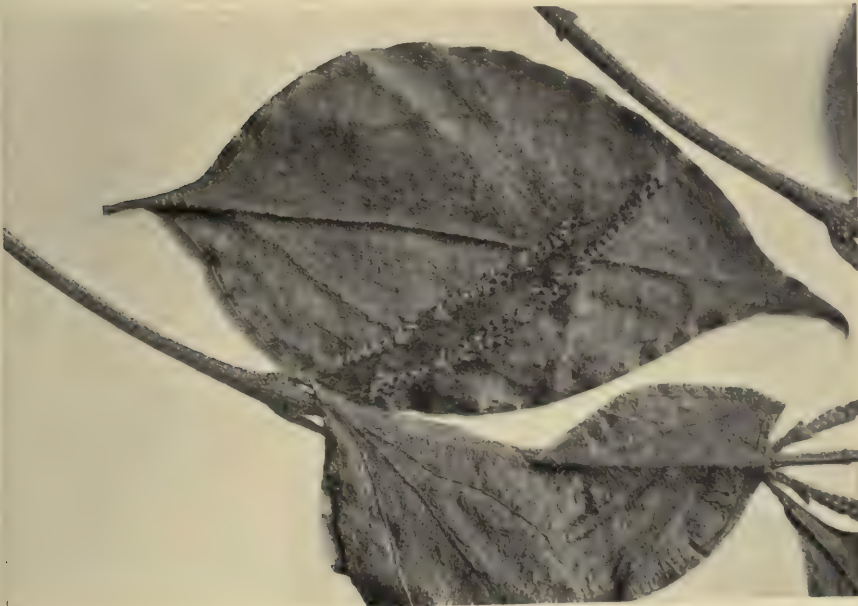
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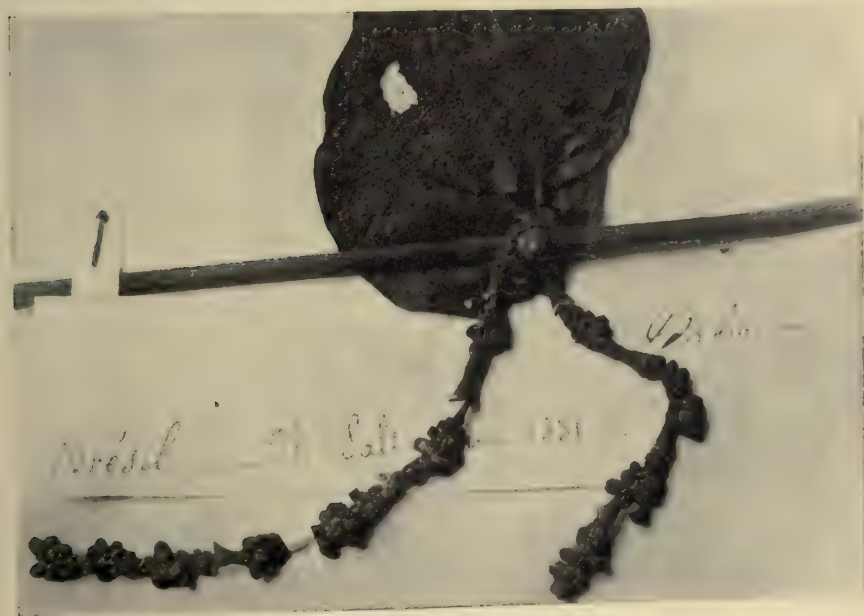
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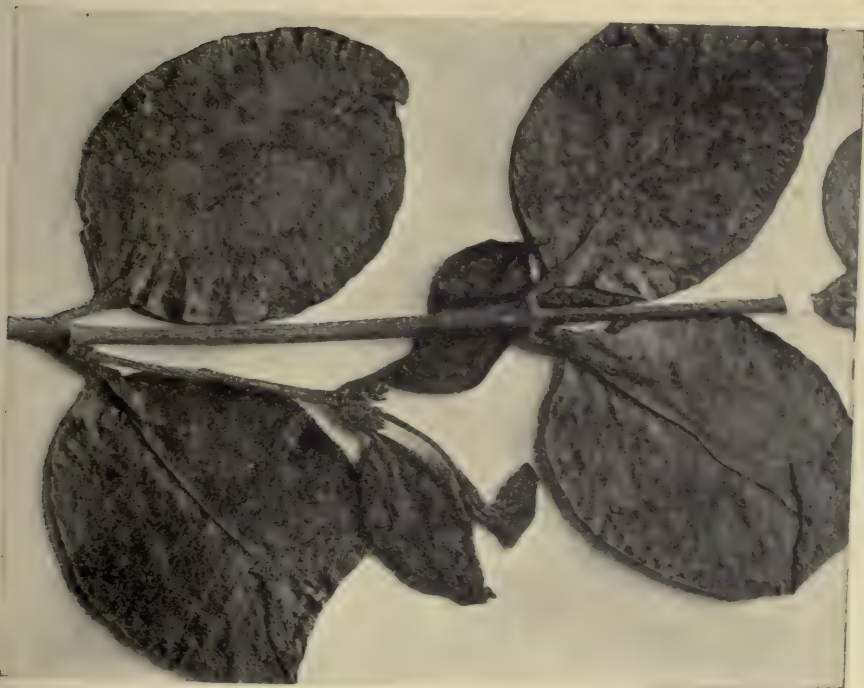
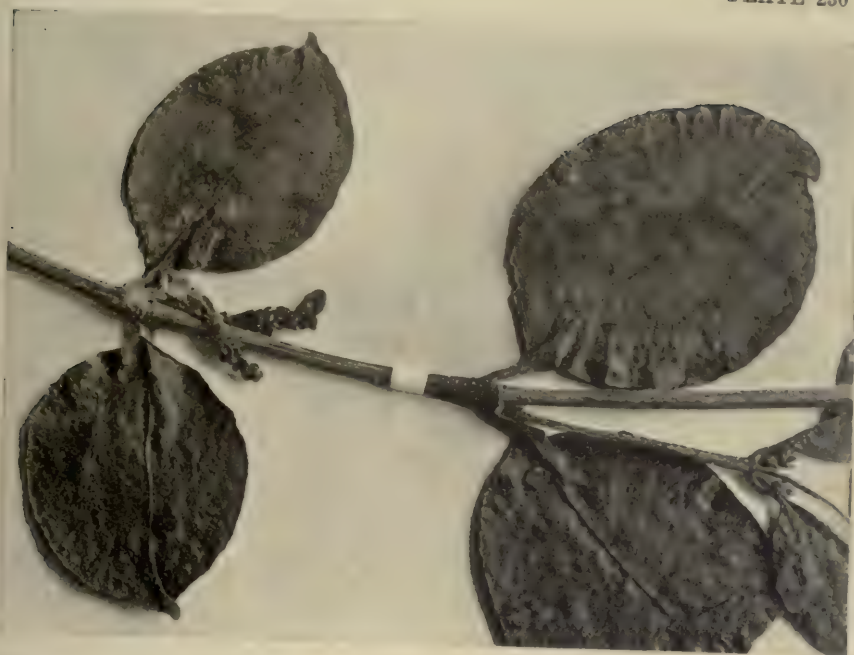
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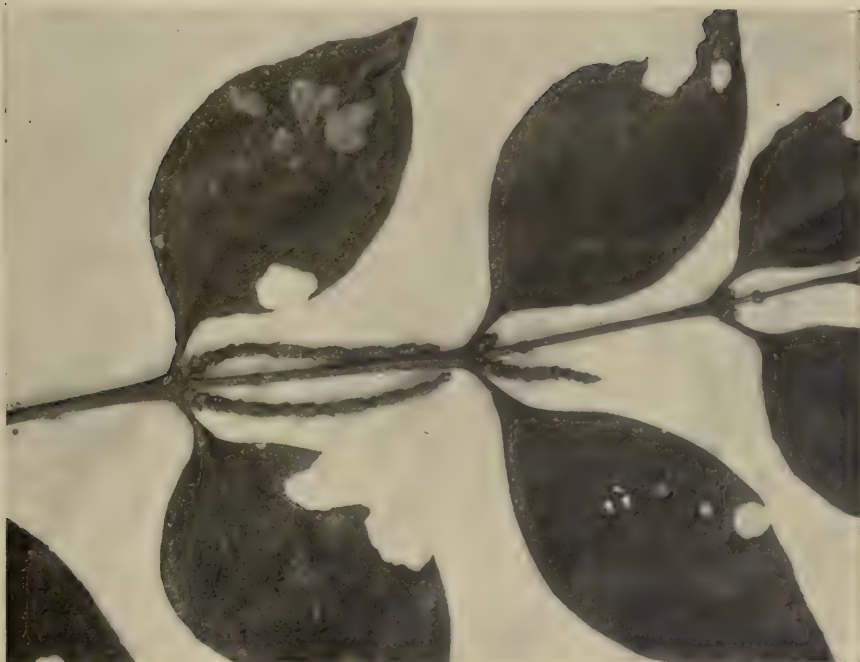
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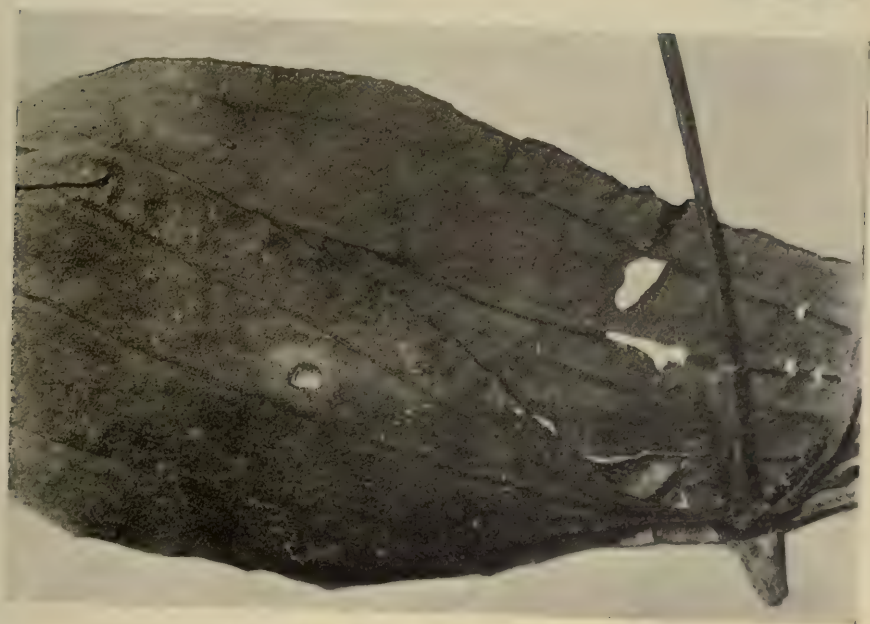
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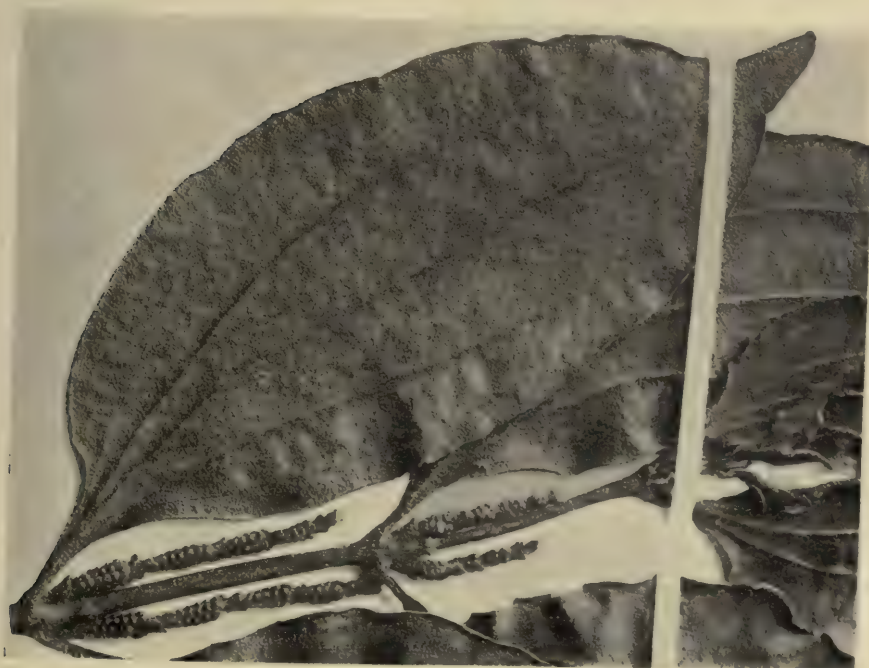
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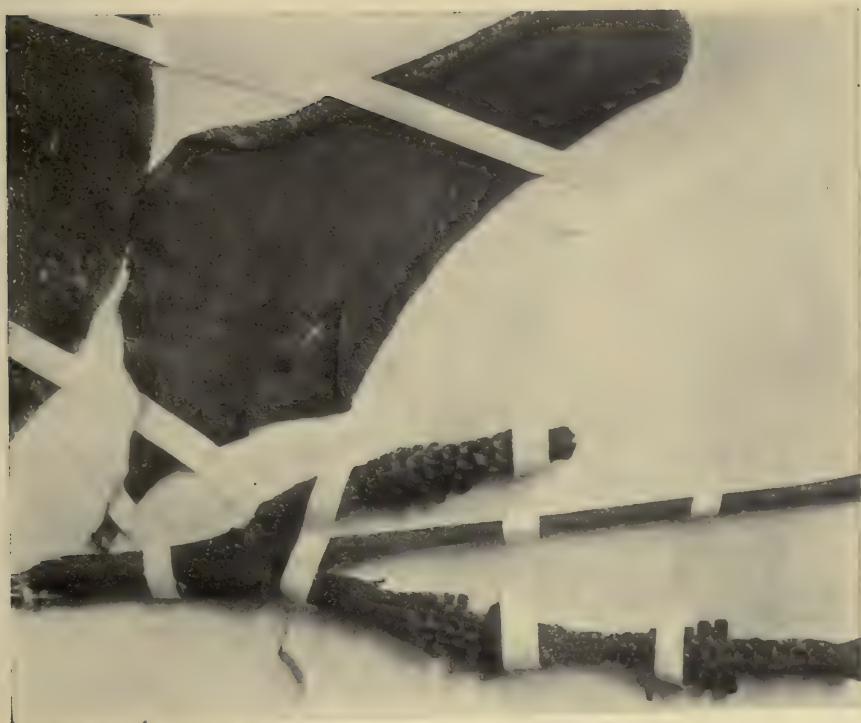
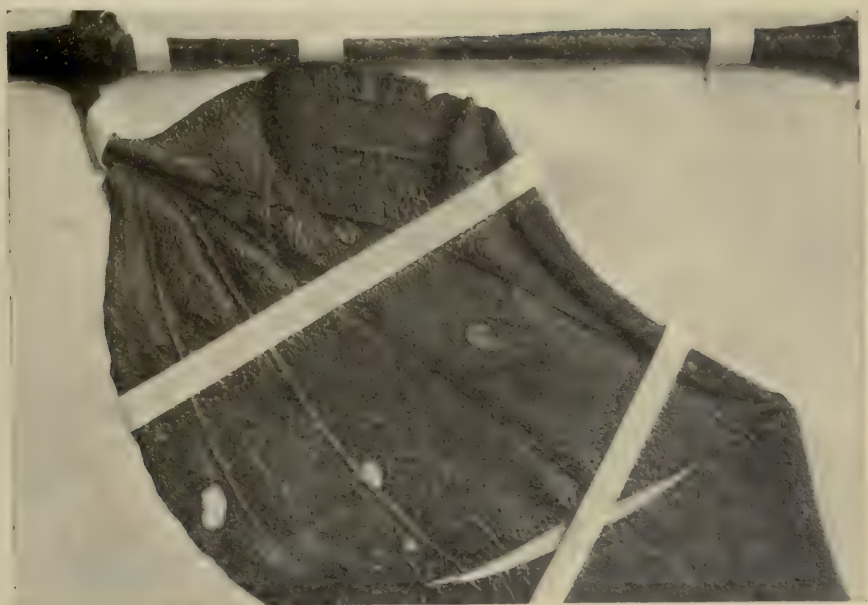
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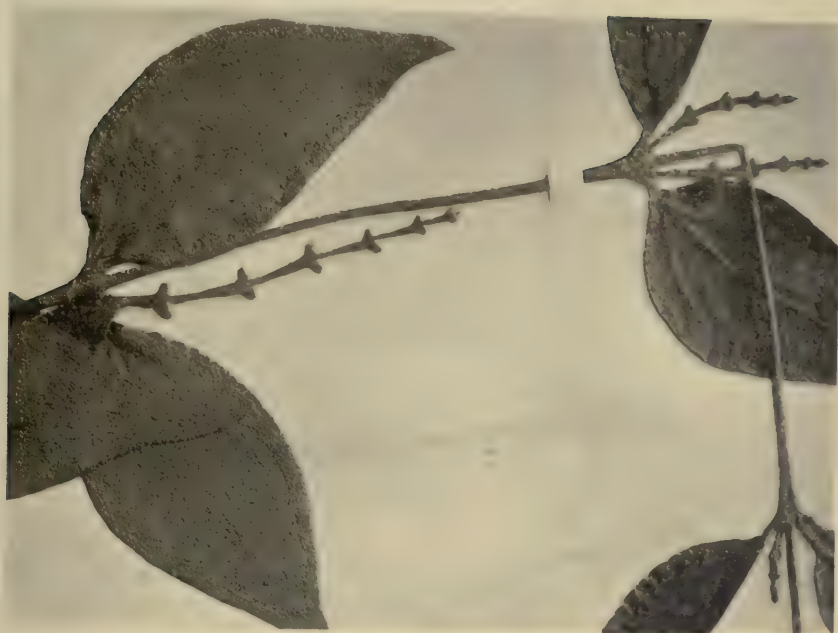
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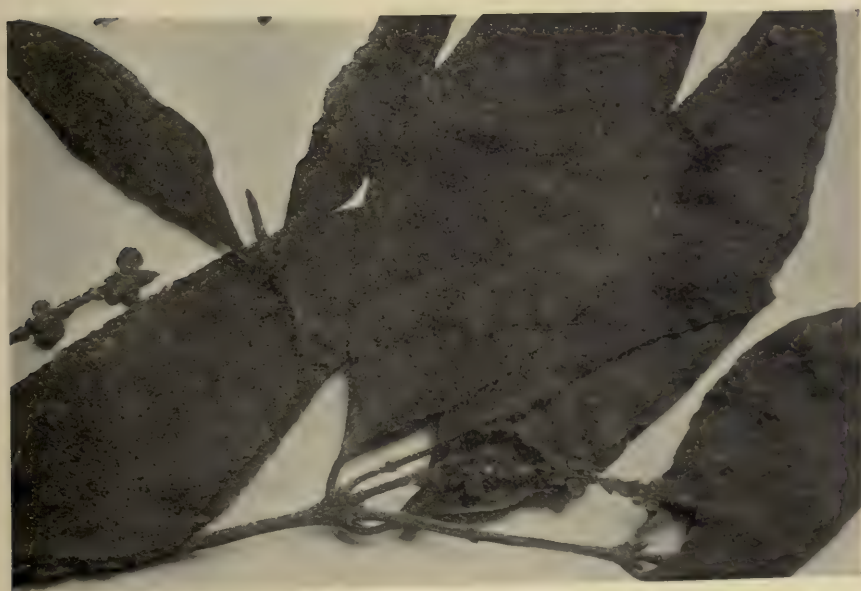
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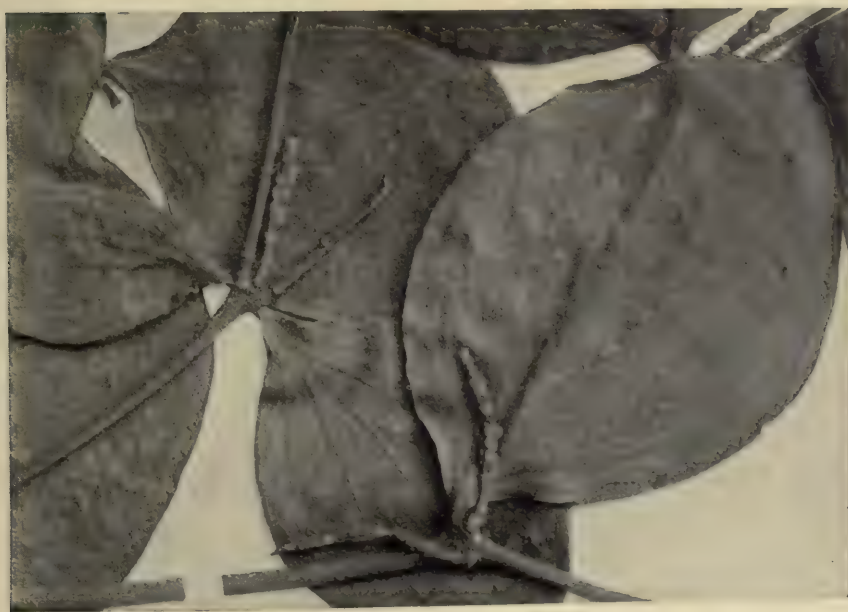
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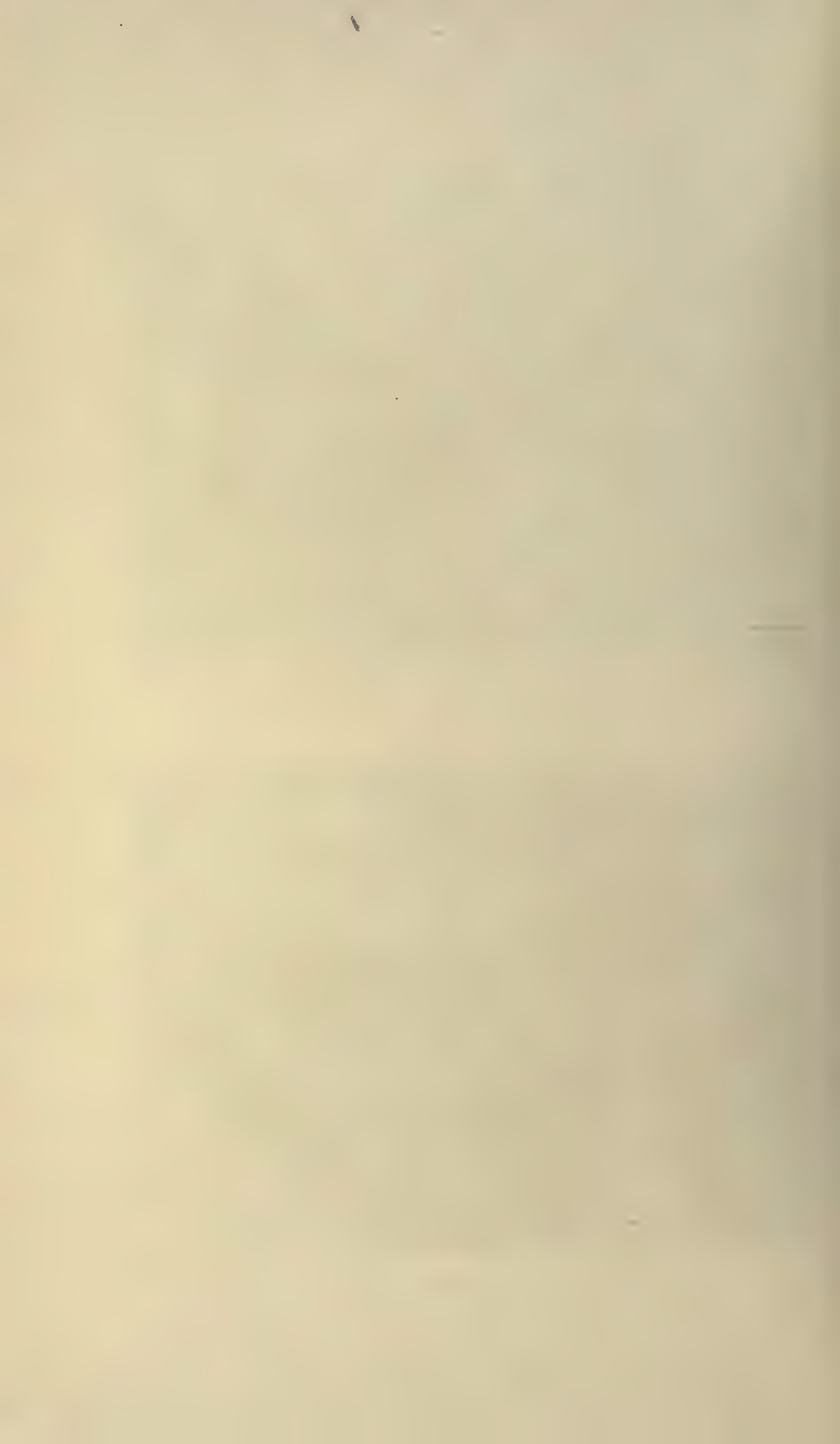
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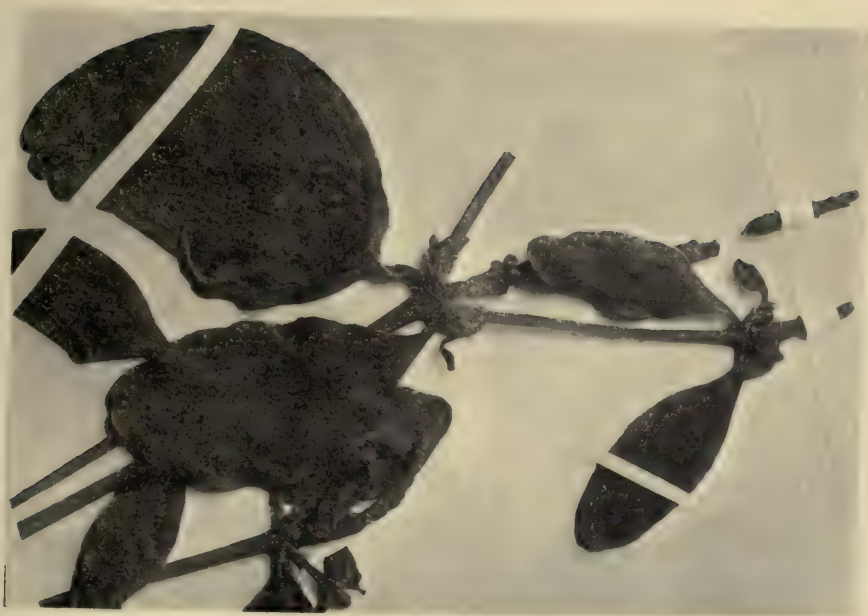


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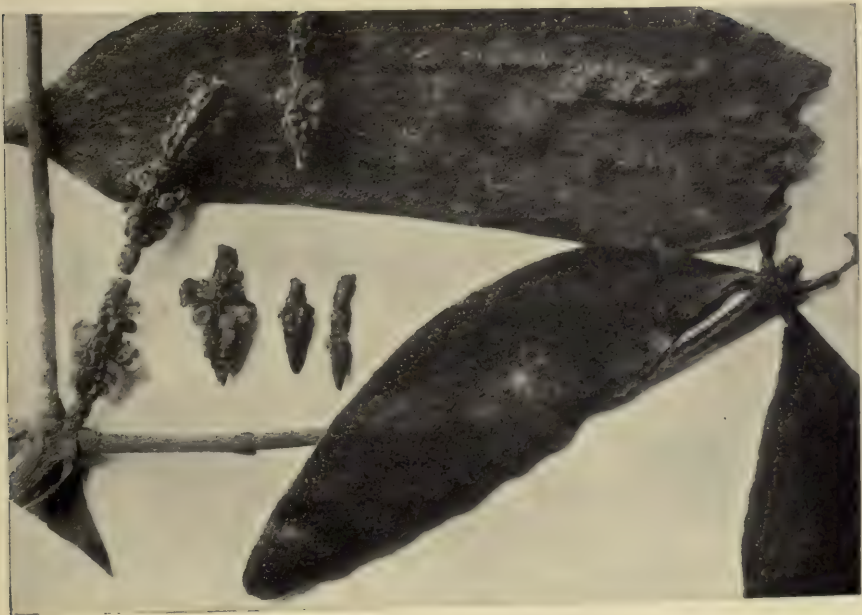
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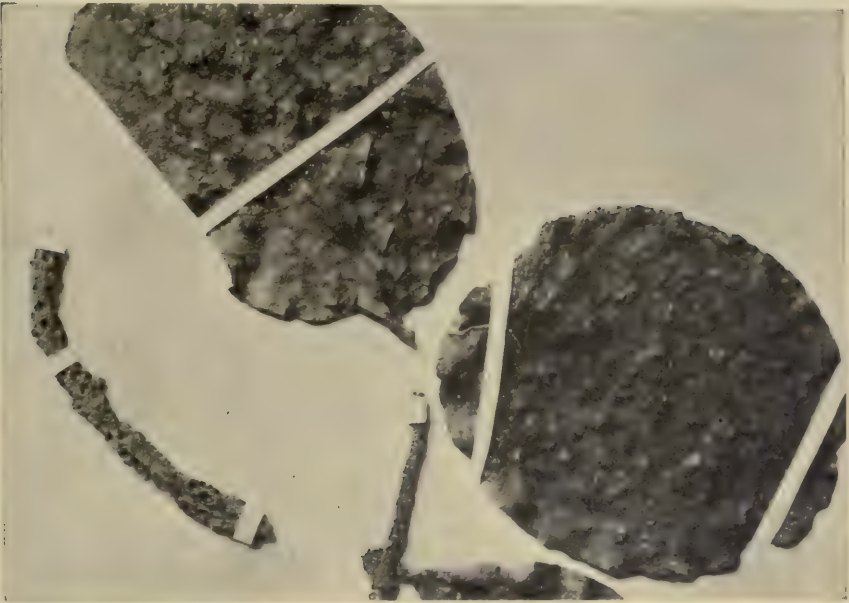
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